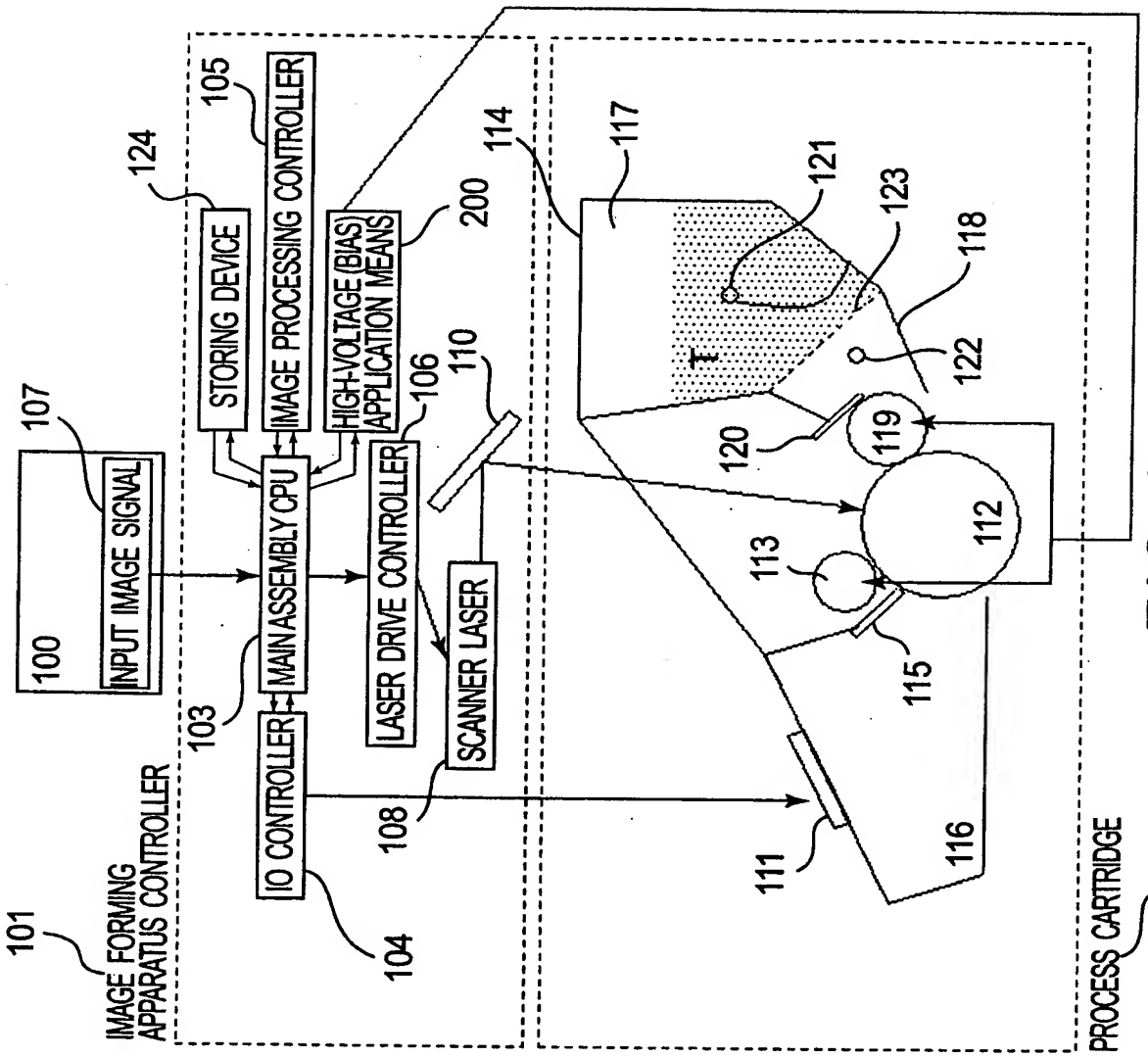
100
INPUT IMAGE SIGNAL
107
101
IMAGE FORMING APPARATUS CONTROLLER
103
MAIN ASSEMBLY CPU
IO CONTROLLER
104
STORING DEVICE
124
105
IMAGE PROCESSING CONTROLLER
HIGH-VOLTAGE (BIAS) APPLICATION MEANS
200
LASER DRIVE CONTROLLER
106
SCANNER LASER
108
110
114
117
121
123
118
122
120
119
112
113
115
111
116
PROCESS CARTRIDGE
102

FIG. 1

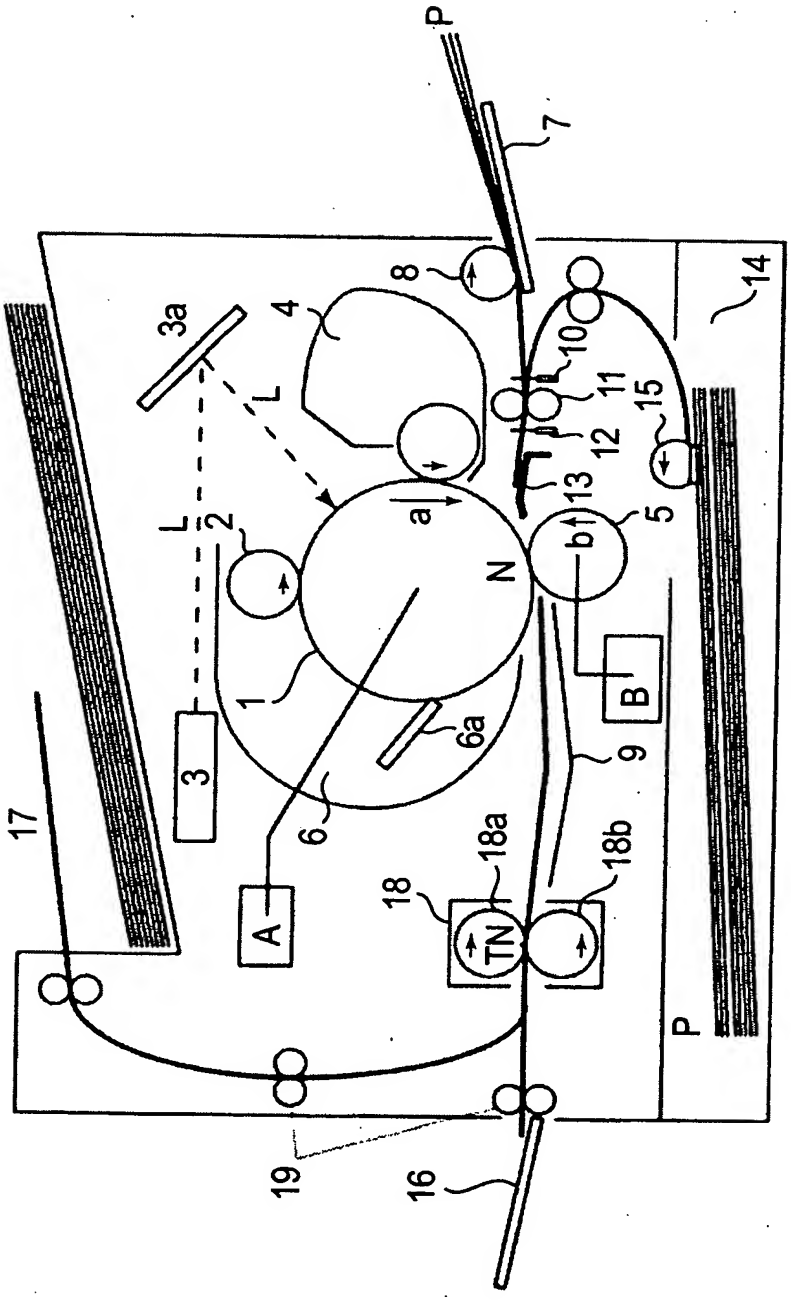

FIG.2

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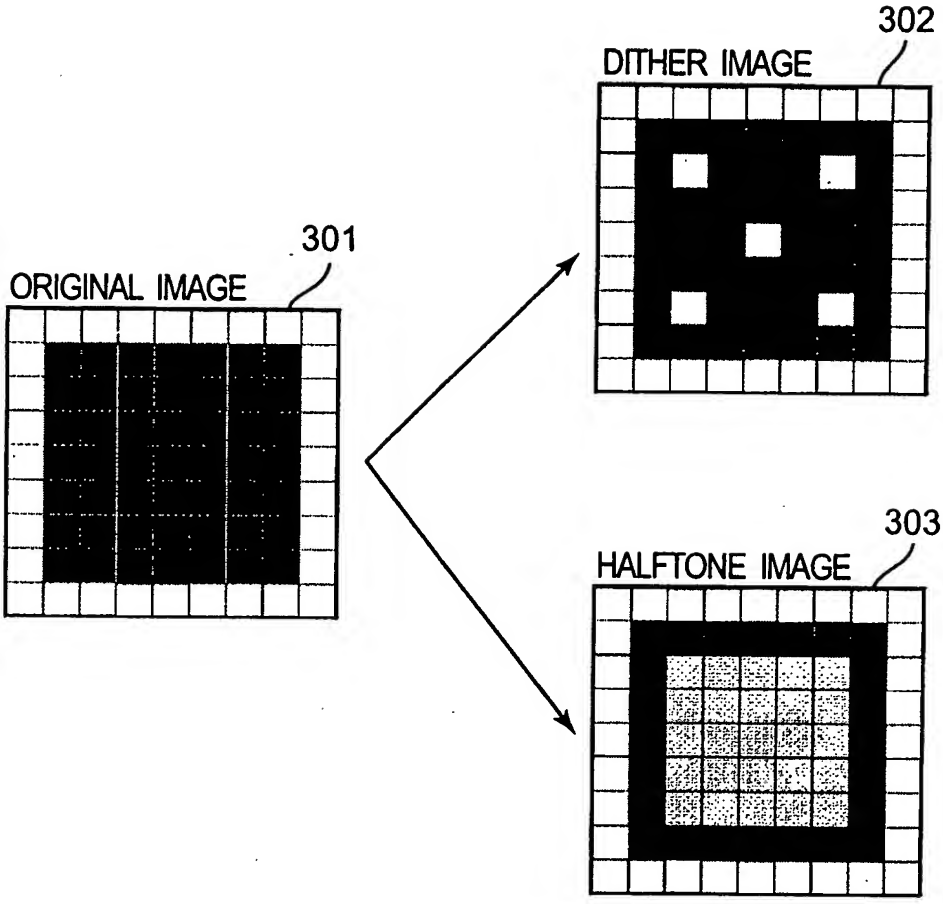


FIG.3

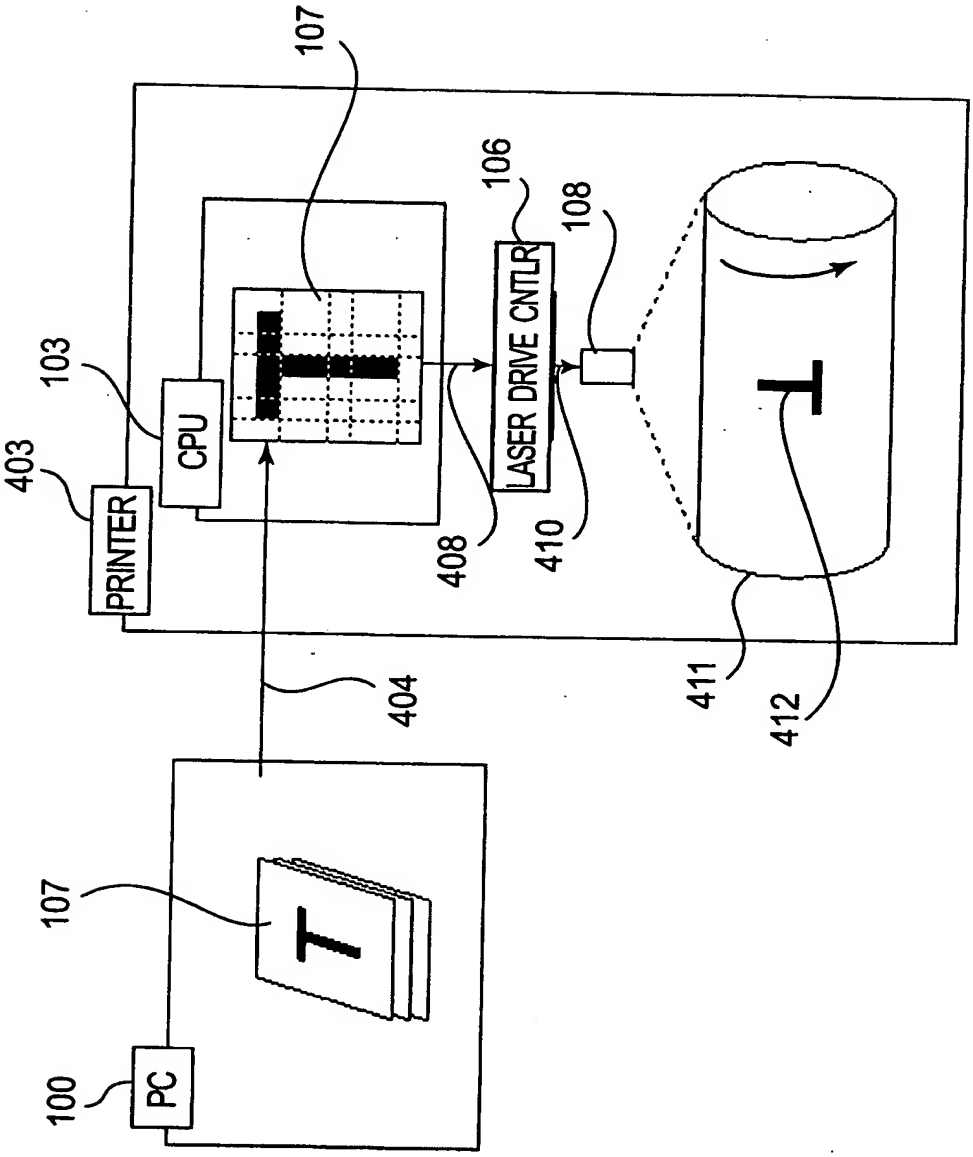

107
106
108
103
CPU
LASER DRIVE CNTLR
403
PRINTER
408
410
404
411
412
107
100
PC

FIG.4

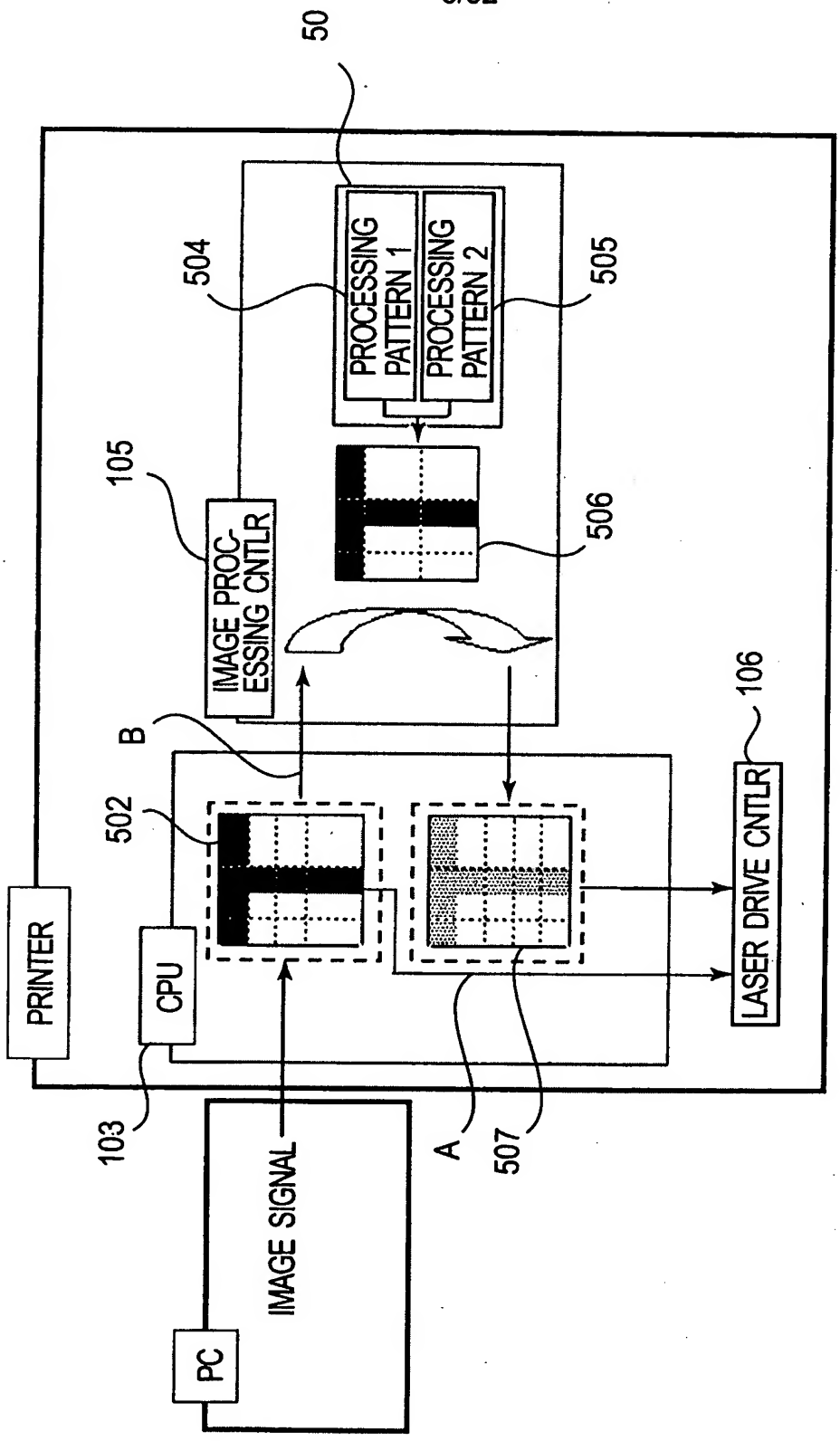

50
504
PROCESSING PATTERN 1
PROCESSING PATTERN 2
505
105
IMAGE PROC-ESSING CNTLR
506
B
106
502
PRINTER
CPU
LASER DRIVE CNTLR
103
IMAGE SIGNAL
A
507
PC

FIG.5

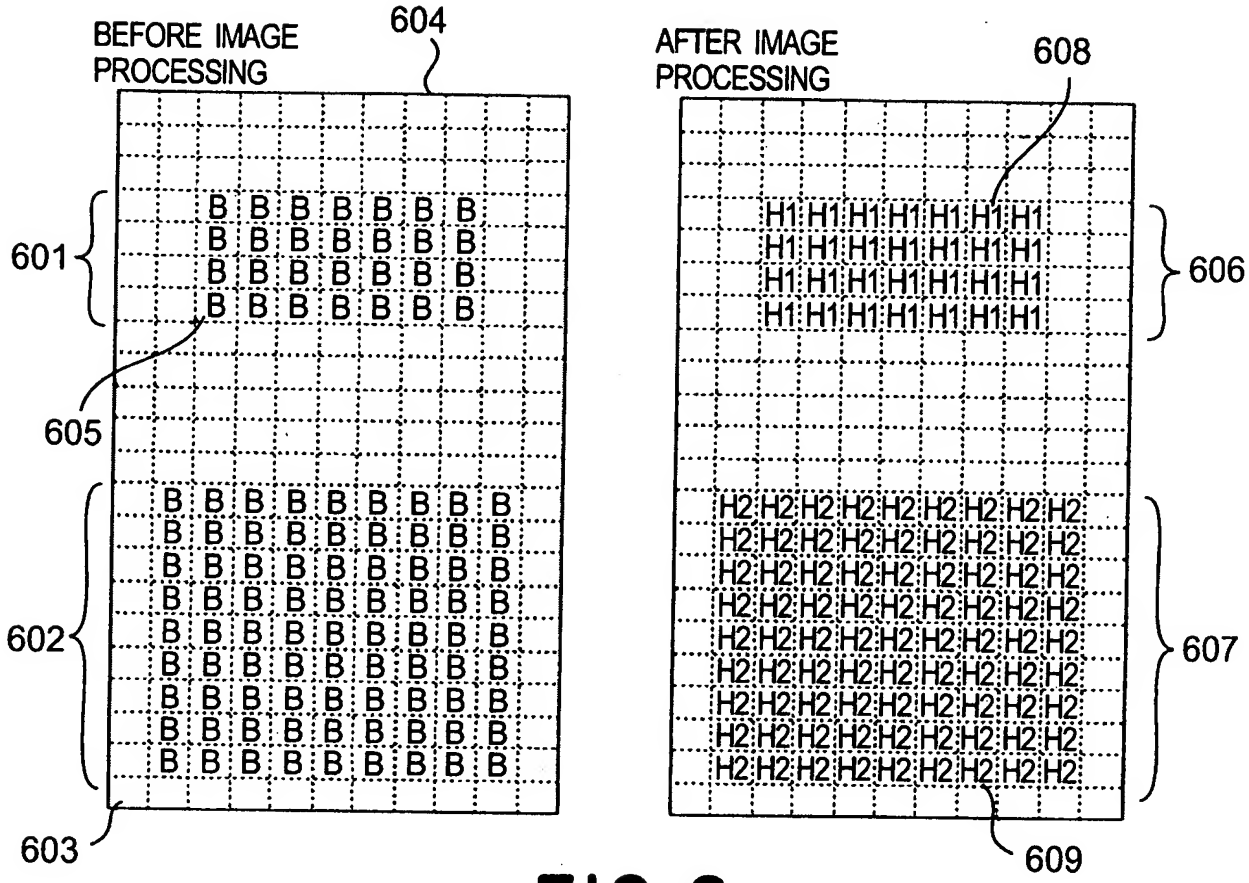

BEFORE IMAGE PROCESSING
604
601
605
602
603
AFTER IMAGE PROCESSING
608
606
607
609

FIG.6

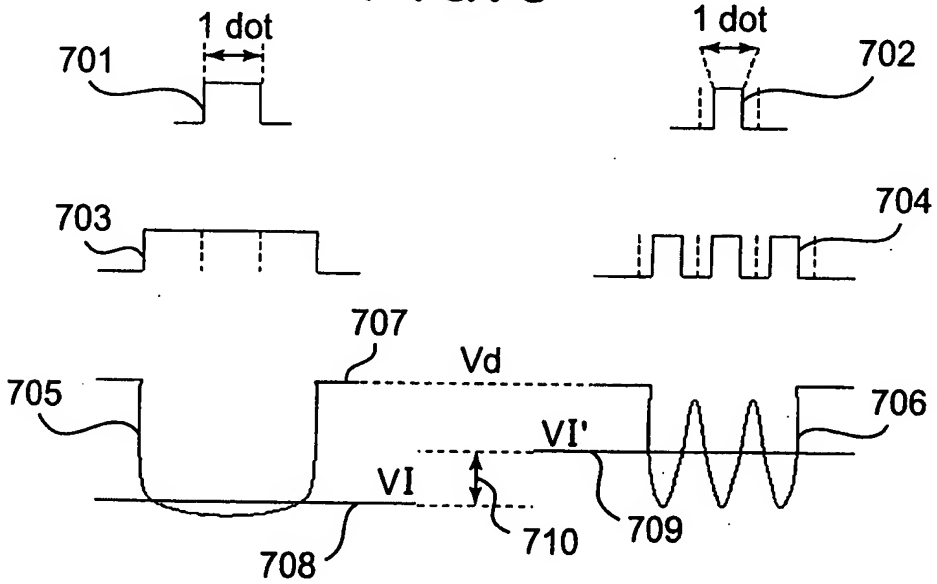
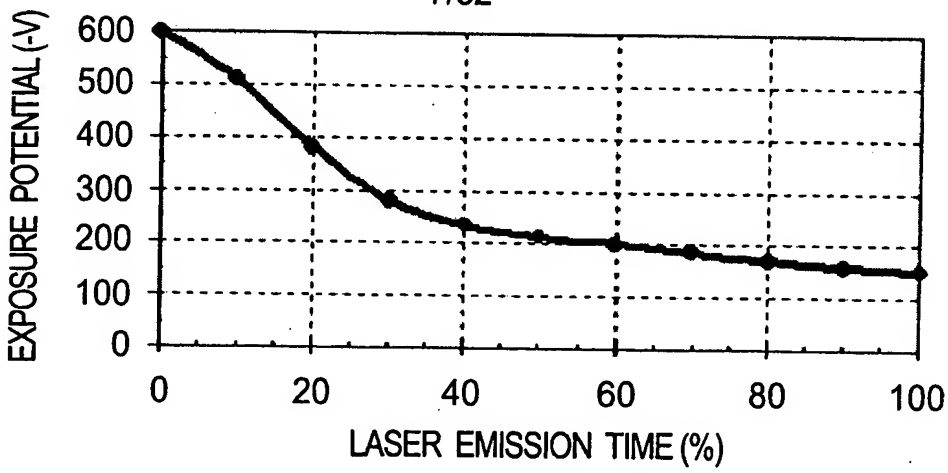
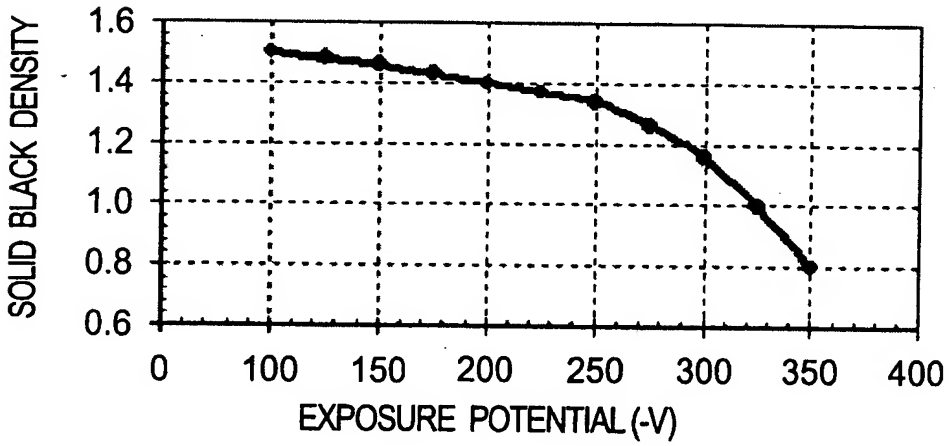

1 dot
701
1 dot
702
703
704
707
Vd
705
706
VI'
VI
708
710
709

FIG.7

(a)


EXPOSURE POTENTIAL (-V)
600
500
400
300
200
100
0
0
20
40
60
80
100
LASER EMISSION TIME (%)

(b)


SOLID BLACK DENSITY
1.6
1.4
1.2
1.0
0.8
0.6
0
100
150
200
250
300
350
400
EXPOSURE POTENTIAL (-V)

(c)

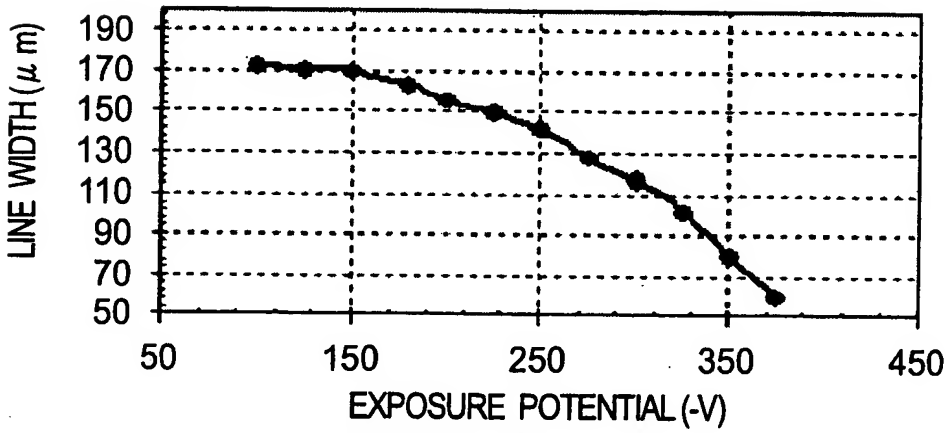

LINE WIDTH (μm)
190
170
150
130
110
90
70
50
50
150
250
350
450
EXPOSURE POTENTIAL (-V)

FIG.8

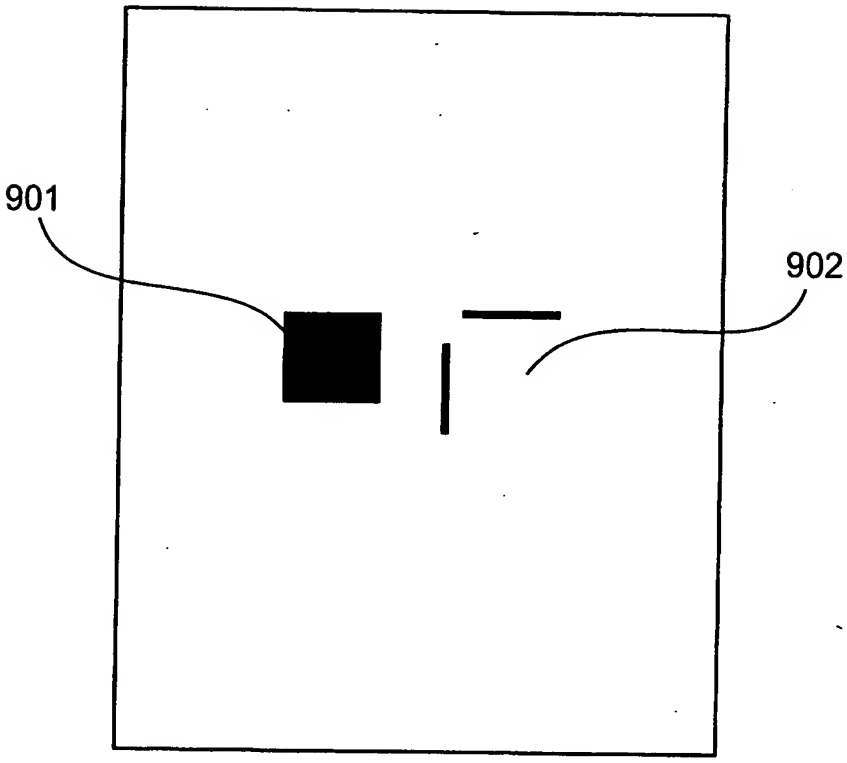
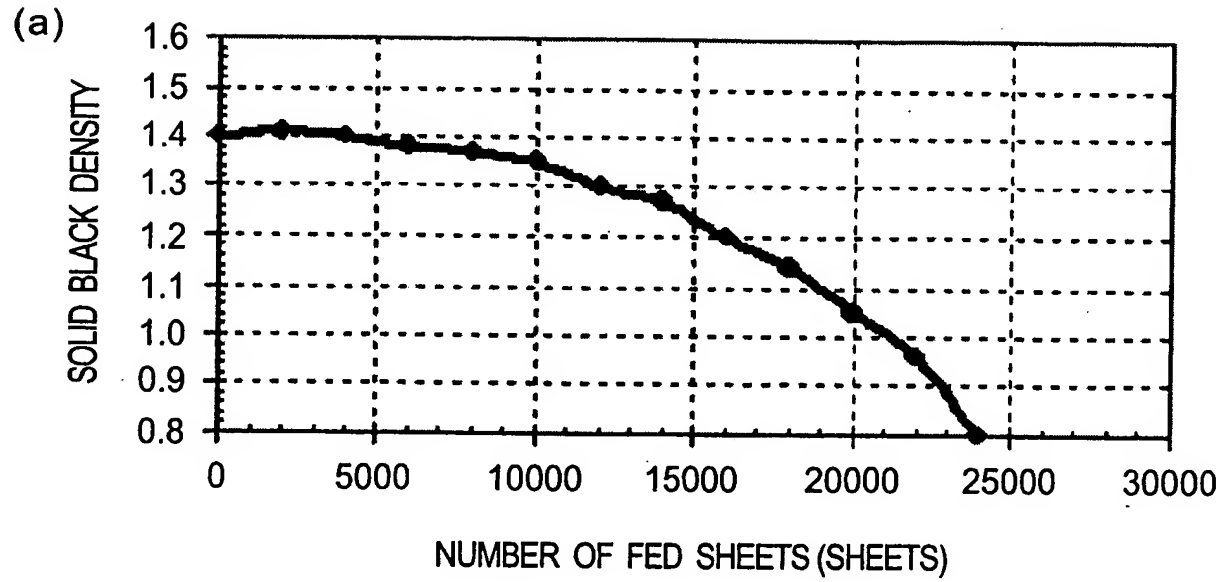


FIG.9


(a)
SOLID BLACK DENSITY
1.6
1.5
1.4
1.3
1.2
1.1
1.0
0.9
0.8
0
5000
10000
15000
20000
25000
30000
NUMBER OF FED SHEETS (SHEETS)

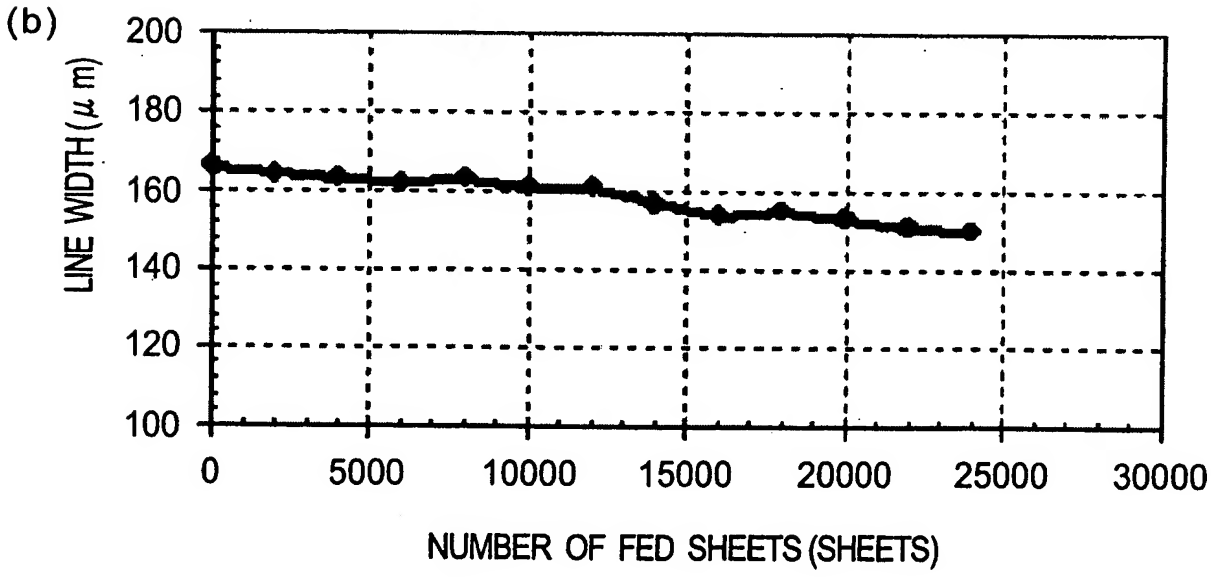

(b)
LINE WIDTH (μm)
200
180
160
140
120
100
0
5000
10000
15000
20000
25000
30000
NUMBER OF FED SHEETS (SHEETS)

FIG. 10

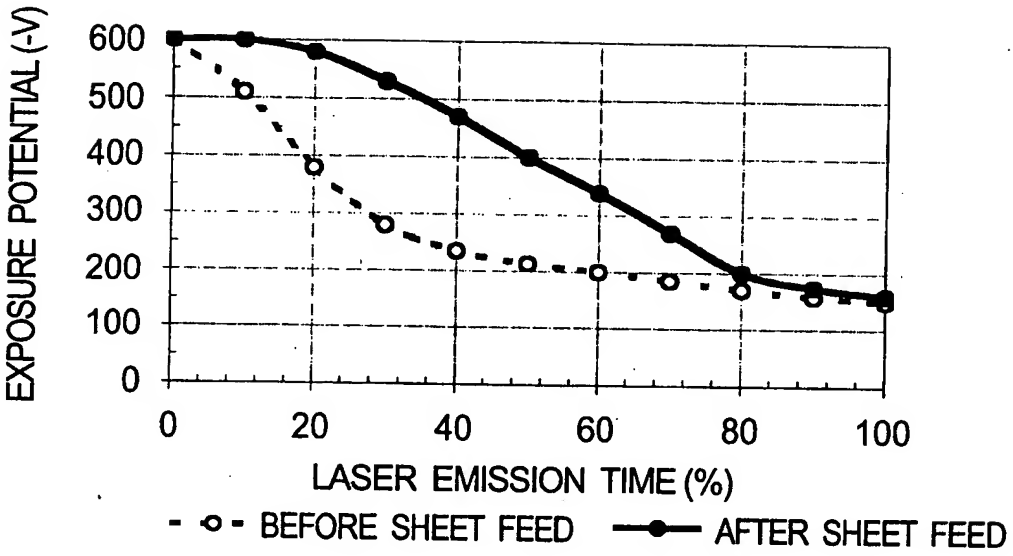

EXPOSURE POTENTIAL (-V)
600
500
400
300
200
100
0
0
20
40
60
80
100
LASER EMISSION TIME (%)
BEFORE SHEET FEED
AFTER SHEET FEED

FIG. 11

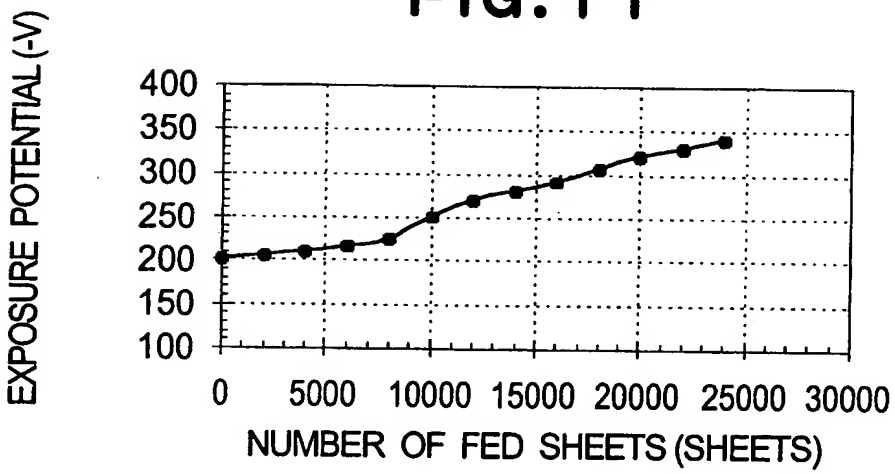

EXPOSURE POTENTIAL (-V)
400
350
300
250
200
150
100
0
5000
10000
15000
20000
25000
30000
NUMBER OF FED SHEETS (SHEETS)

FIG. 12

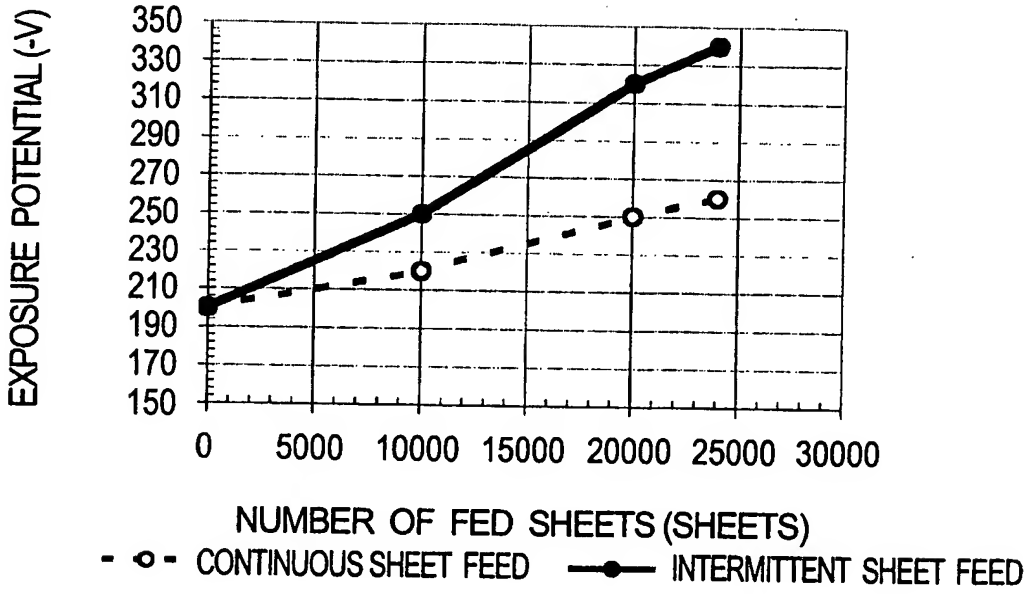


FIG. 13

	APPLICATION TIME				CONTINUOUS FEED	INTERMIT-TENT FEED
	PRE-ROTATION	SHEET FEED	POST-ROTATION	SHEET INTERVAL		
Pt	2.0	1.7	2.0	1.0	2.7	5.7
Dt	2.5	1.7	2.5	1.0	2.7	6.7

(sec)

FIG. 14

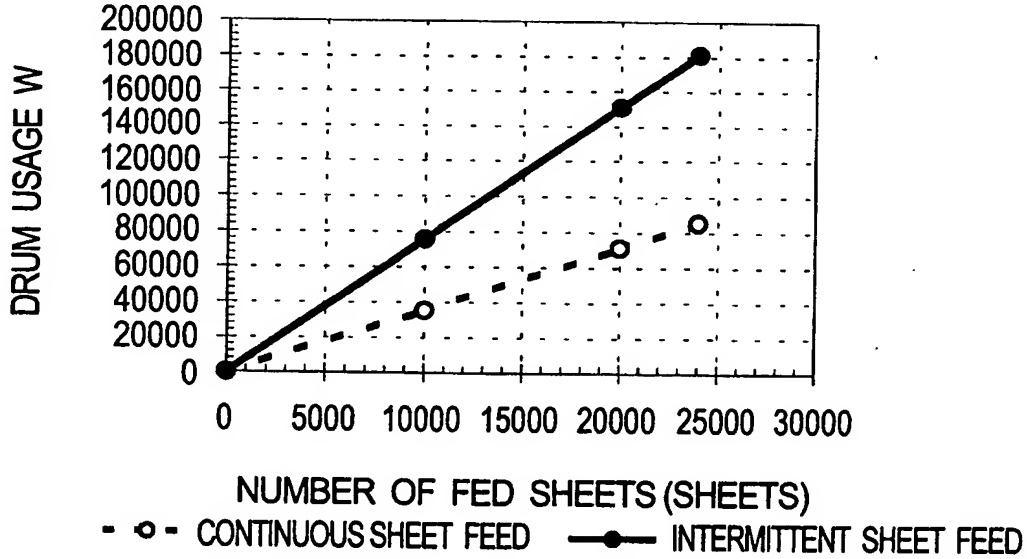


FIG. 15

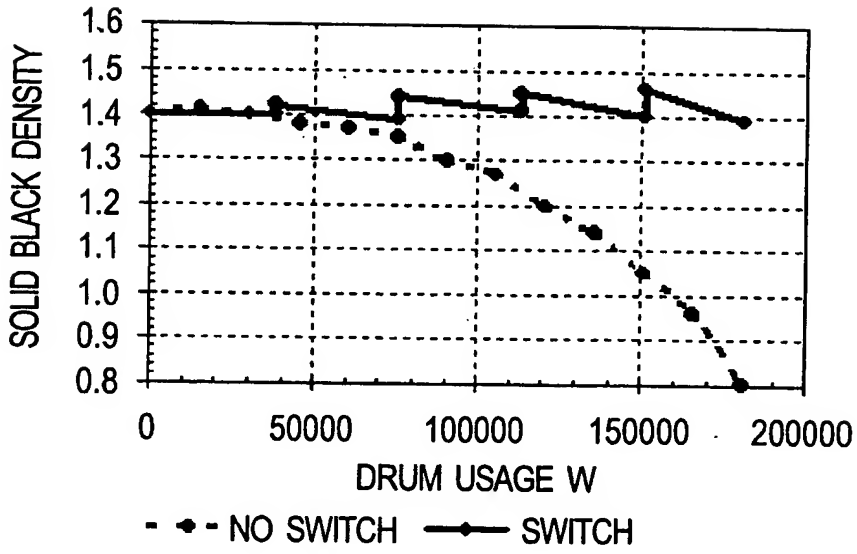
DRUM USAGE	SMALL PIXEL	LARGE PIXEL
0	80%	60%
37750	83%	65%
75500	85%	70%
113250	88%	75%
151000	90%	80%
181200	92%	85%

FIG. 16

PROCESS CONDITON	DRUM USAGE	SMALL PIXEL	LARGE PIXEL
0	0	80%	60%
1	37750	83%	65%
2	75500	85%	70%
3	113250	88%	75%
4	151000	90%	80%
5	181200	92%	85%

FIG. 17

(a)


SOLID BLACK DENSITY
1.6
1.5
1.4
1.3
1.2
1.1
1.0
0.9
0.8
0
50000
100000
150000
200000
DRUM USAGE W
NO SWITCH
SWITCH

(b)

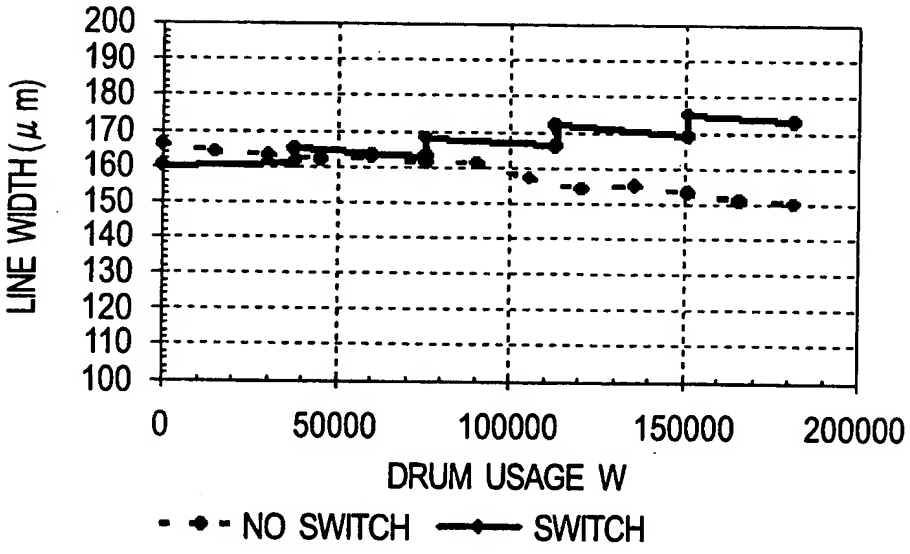

LINE WIDTH (μm)
200
190
180
170
160
150
140
130
120
110
100
0
50000
100000
150000
200000
DRUM USAGE W
NO SWITCH
SWITCH

FIG. 18

FIG.19A

FIG.19B

FIG.19

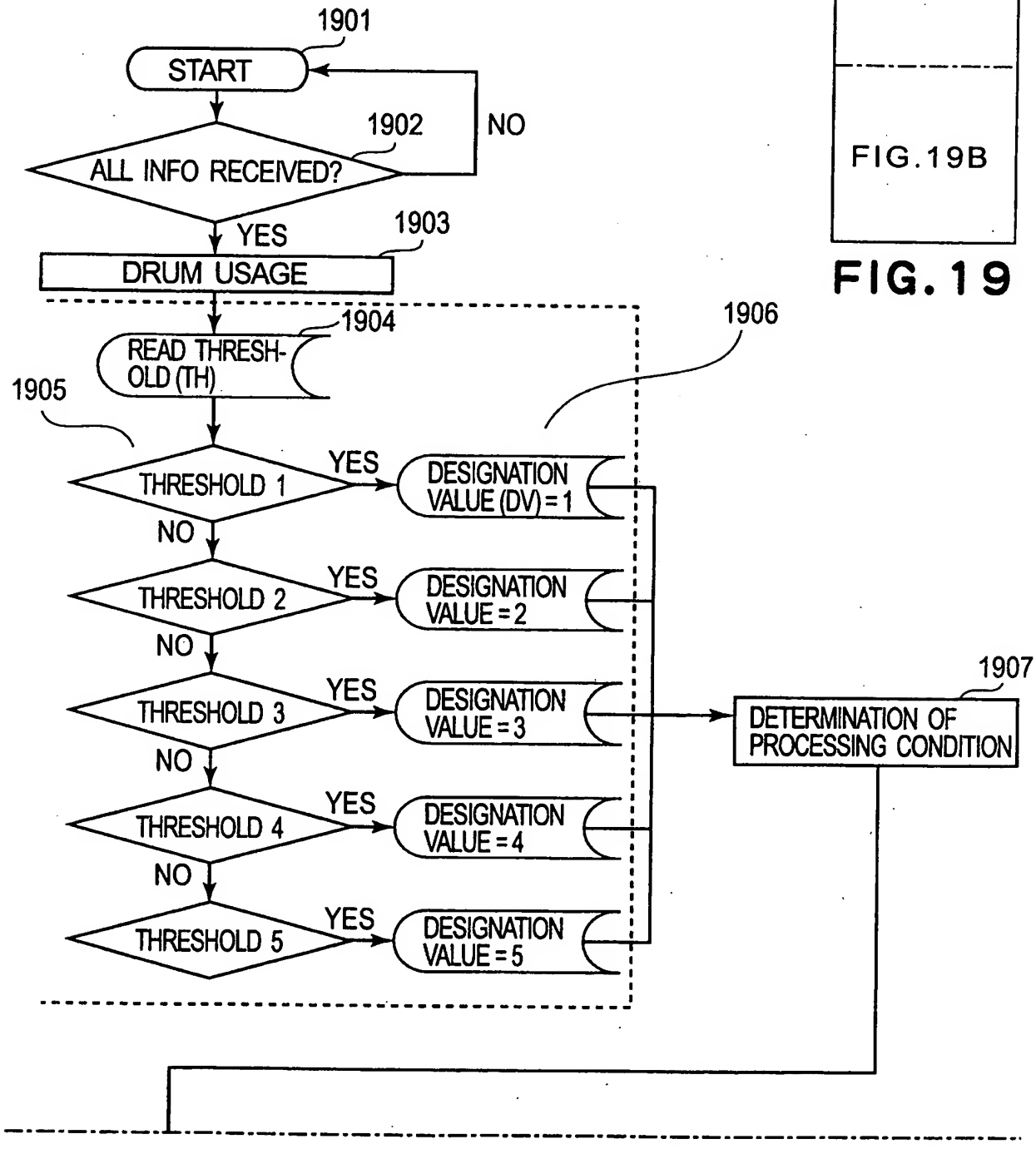


FIG.19A

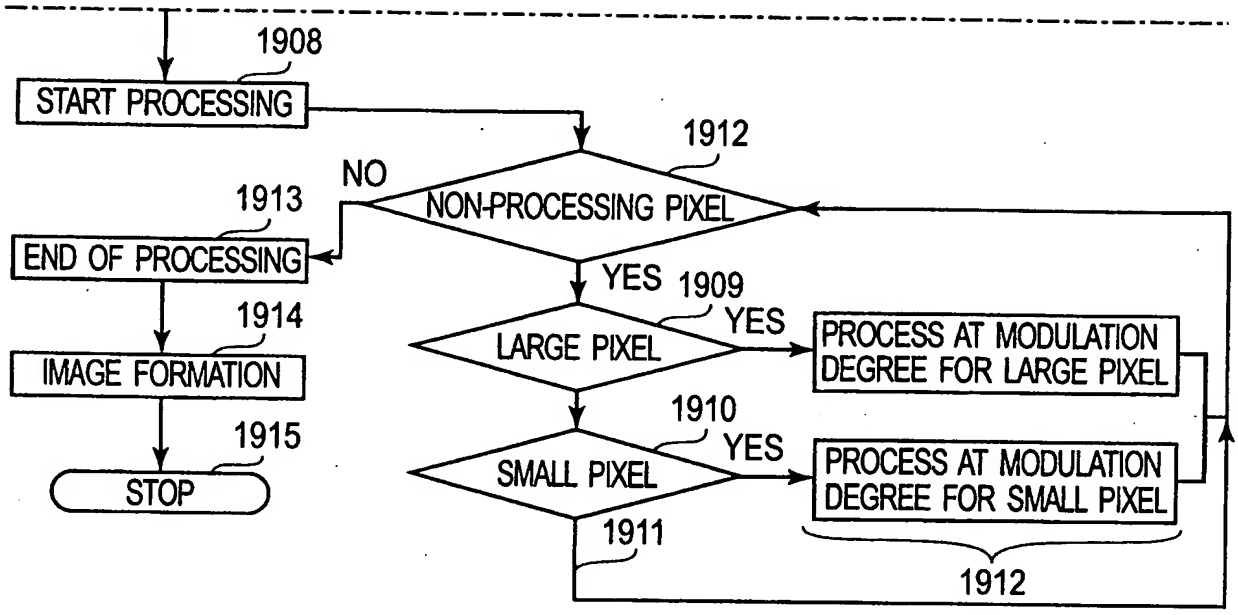

1908
START PROCESSING
1912
NON-PROCESSING PIXEL
NO
1913
END OF PROCESSING
YES
1909
LARGE PIXEL
YES
PROCESS AT MODULATION DEGREE FOR LARGE PIXEL
1914
IMAGE FORMATION
1910
SMALL PIXEL
YES
PROCESS AT MODULATION DEGREE FOR SMALL PIXEL
1915
STOP
1911
1912

FIG. 19B

ID NO.	PROCESSING CONDITION	LINE IMAGE	SOLID BLACK IMAGE
1	PROCESSING CONDITION 1	75%	50%
2	PROCESSING CONDITION 2	77%	55%
3	PROCESSING CONDITION 3	80%	60%
4	PROCESSING CONDITION 4	83%	65%
5	PROCESSING CONDITION 5	85%	70%
6	PROCESSING CONDITION 6	88%	75%
7	PROCESSING CONDITION 7	90%	80%
8	PROCESSING CONDITION 8	93%	85%
9	PROCESSING CONDITION 9	95%	90%

FIG.20

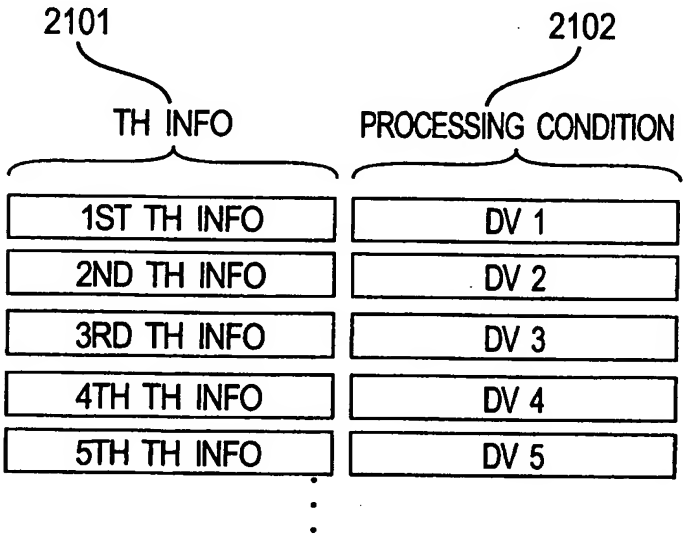


FIG.21

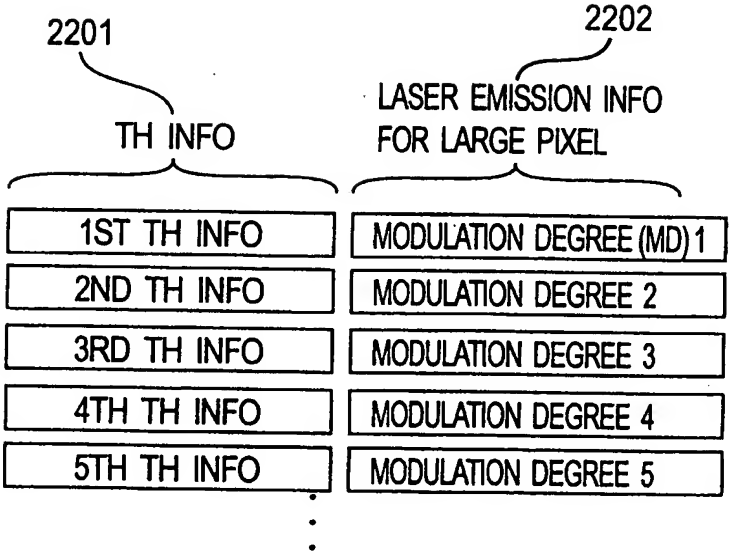

2201
2202
TH INFO
LASER EMISSION INFO FOR LARGE PIXEL
1ST TH INFO
MODULATION DEGREE (MD) 1
2ND TH INFO
MODULATION DEGREE 2
3RD TH INFO
MODULATION DEGREE 3
4TH TH INFO
MODULATION DEGREE 4
5TH TH INFO
MODULATION DEGREE 5

FIG.22

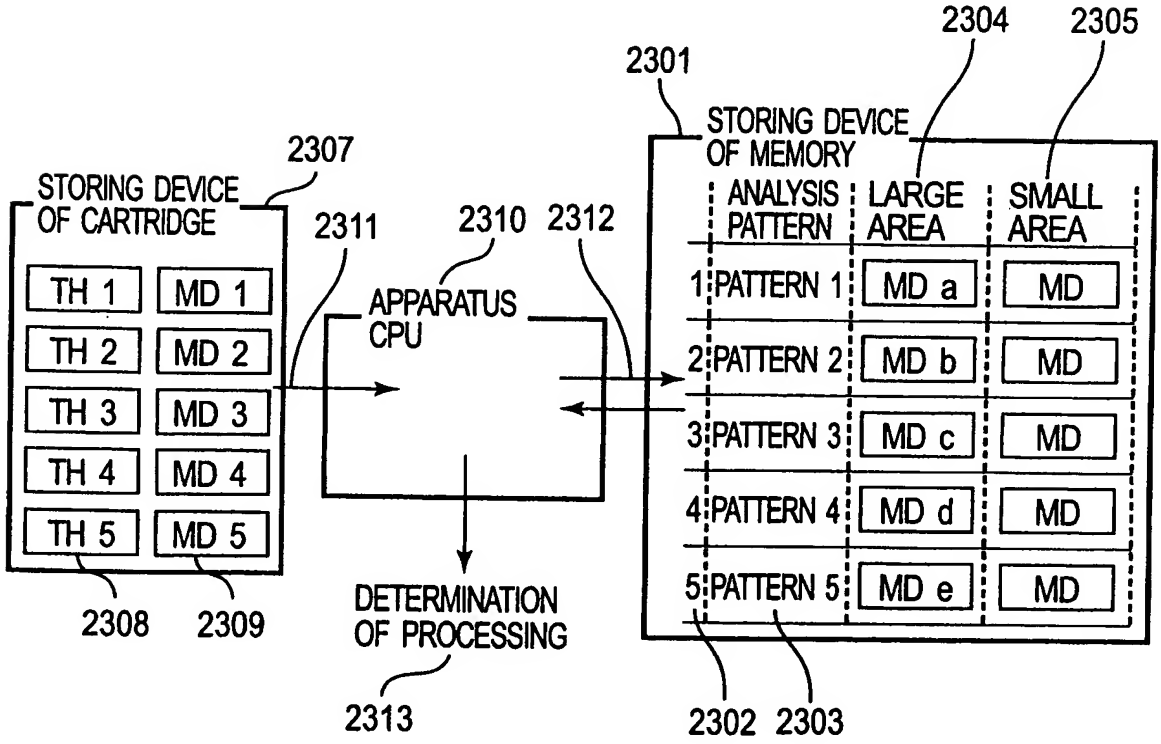

2304
2305
2301
STORING DEVICE OF MEMORY
ANALYSIS PATTERN
LARGE AREA
SMALL AREA
1 PATTERN 1
MD a
MD
2 PATTERN 2
MD b
MD
3 PATTERN 3
MD c
MD
4 PATTERN 4
MD d
MD
5 PATTERN 5
MD e
MD
2307
STORING DEVICE OF CARTRIDGE
TH 1
MD 1
TH 2
MD 2
TH 3
MD 3
TH 4
MD 4
TH 5
MD 5
2311
2310
2312
APPARATUS CPU
DETERMINATION OF PROCESSING
2308
2309
2313
2302
2303

FIG.23

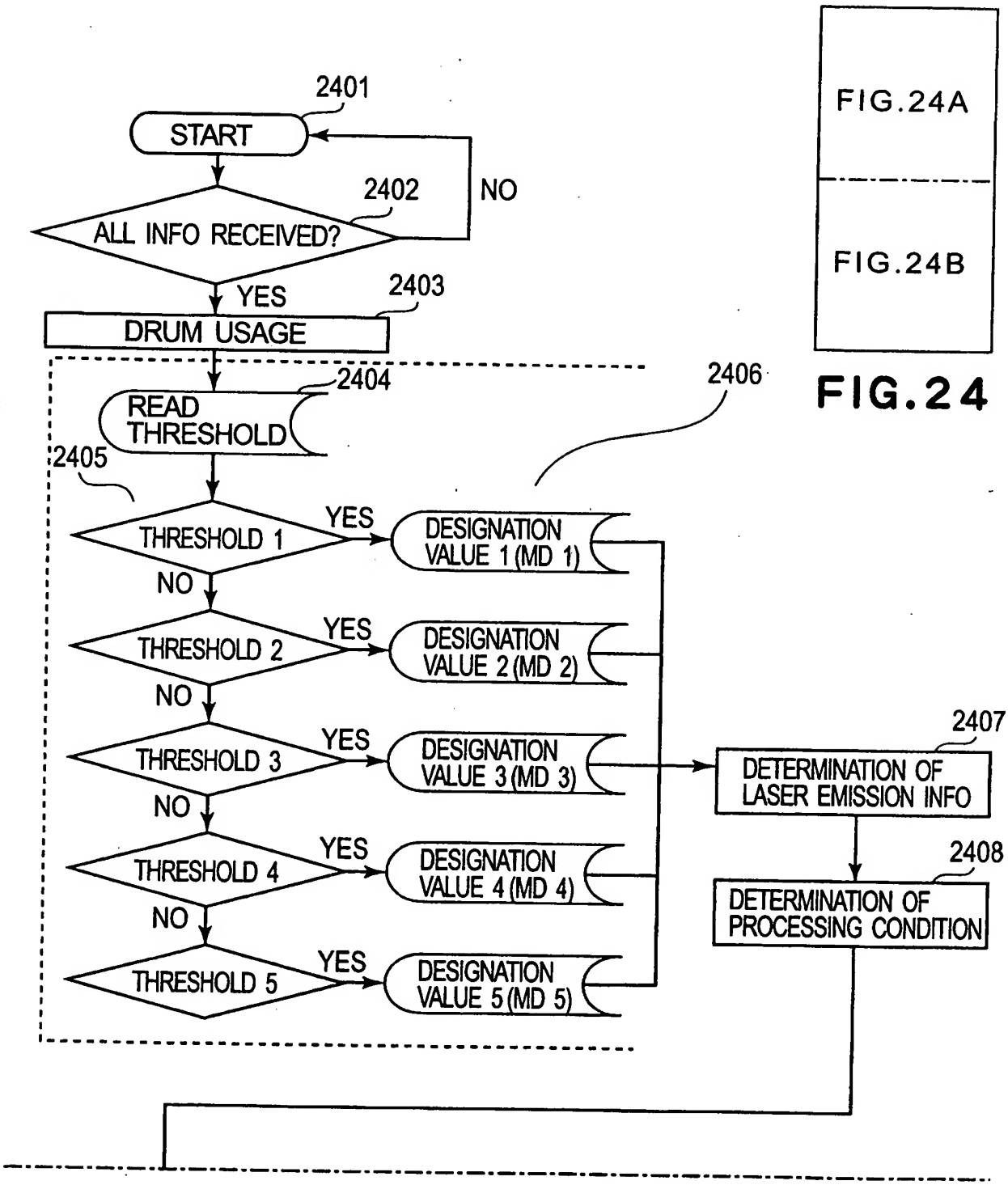


FIG.24A

FIG.24B

FIG.24

FIG.24A

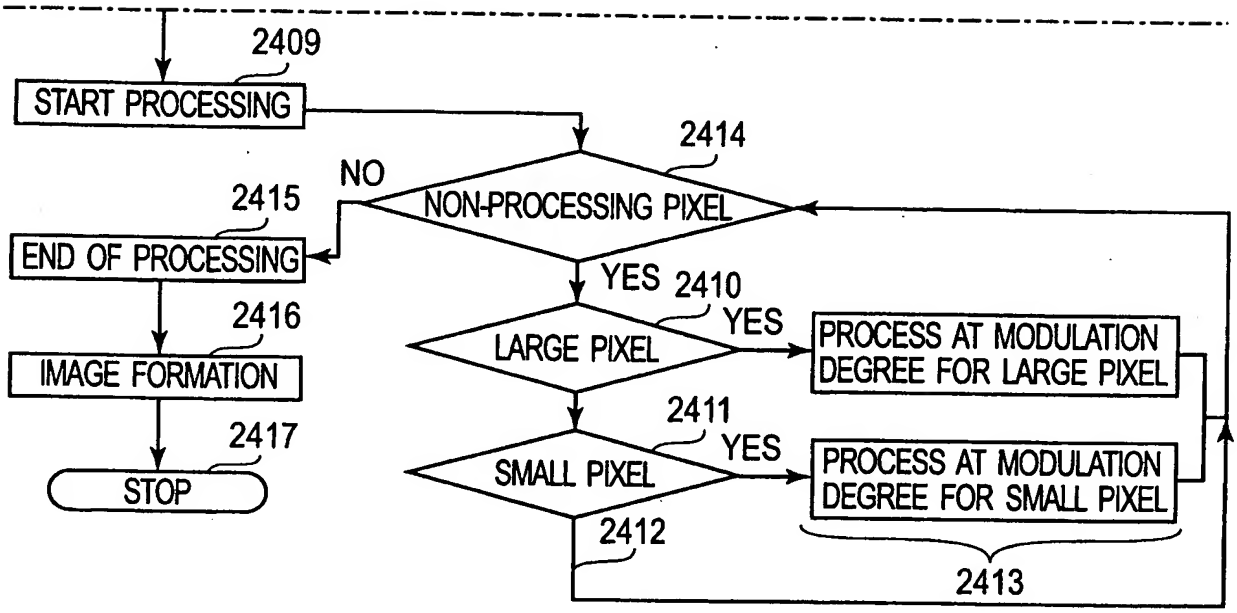

2409
START PROCESSING
2414
NON-PROCESSING PIXEL
NO
2415
END OF PROCESSING
YES
2410
LARGE PIXEL
YES
PROCESS AT MODULATION DEGREE FOR LARGE PIXEL
2416
IMAGE FORMATION
2411
SMALL PIXEL
YES
PROCESS AT MODULATION DEGREE FOR SMALL PIXEL
2417
STOP
2412
2413

FIG.24B

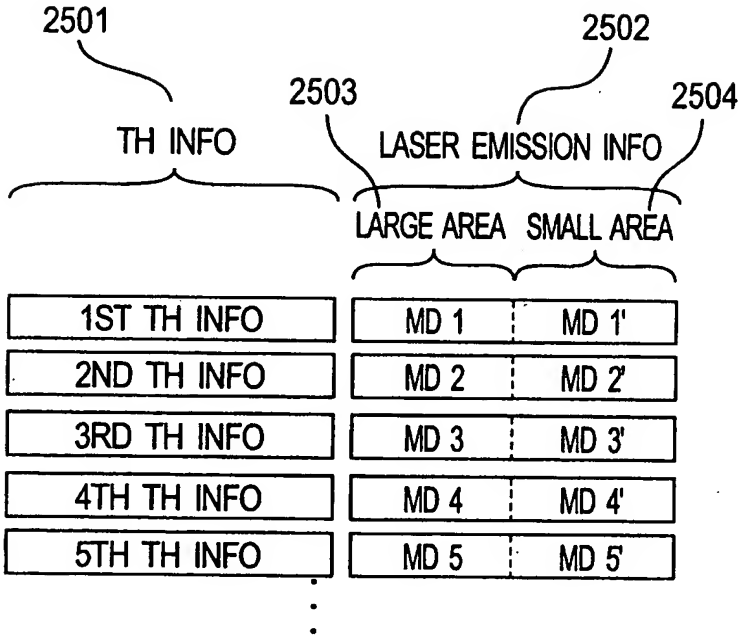

2501
2502
2503
2504
TH INFO
LASER EMISSION INFO
LARGE AREA
SMALL AREA
1ST TH INFO
MD 1
MD 1'
2ND TH INFO
MD 2
MD 2'
3RD TH INFO
MD 3
MD 3'
4TH TH INFO
MD 4
MD 4'
5TH TH INFO
MD 5
MD 5'

FIG.25

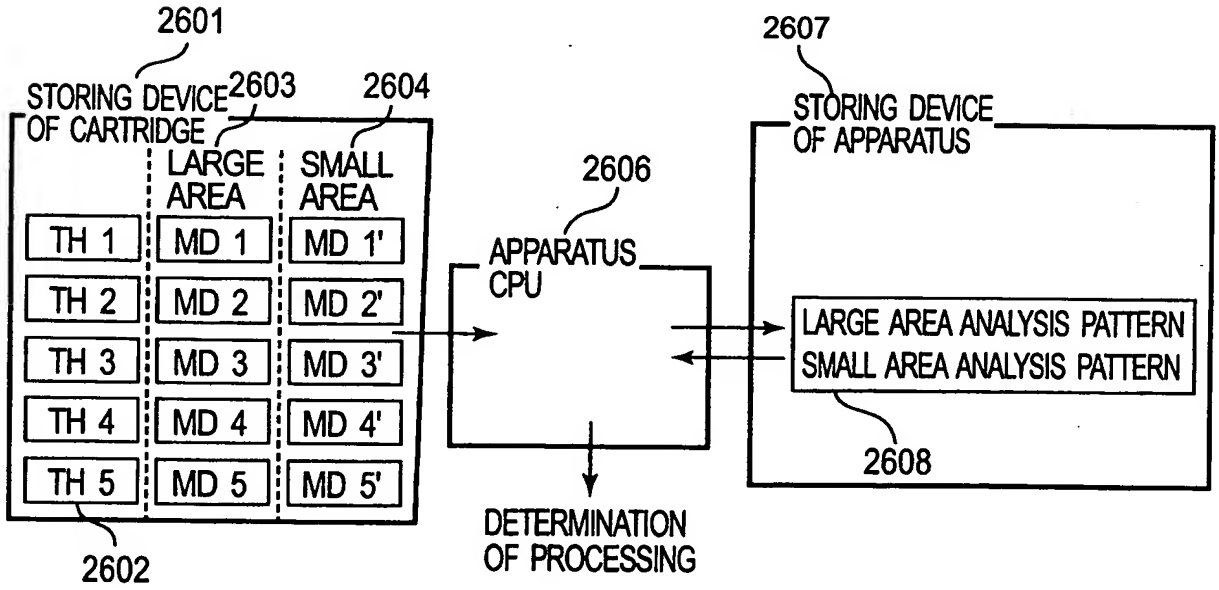

2601
STORING DEVICE OF CARTRIDGE
2603
2604
LARGE AREA
SMALL AREA
TH 1
MD 1
MD 1'
TH 2
MD 2
MD 2'
TH 3
MD 3
MD 3'
TH 4
MD 4
MD 4'
TH 5
MD 5
MD 5'
2602
2606
APPARATUS CPU
DETERMINATION OF PROCESSING
2607
STORING DEVICE OF APPARATUS
LARGE AREA ANALYSIS PATTERN
SMALL AREA ANALYSIS PATTERN
2608

FIG.26

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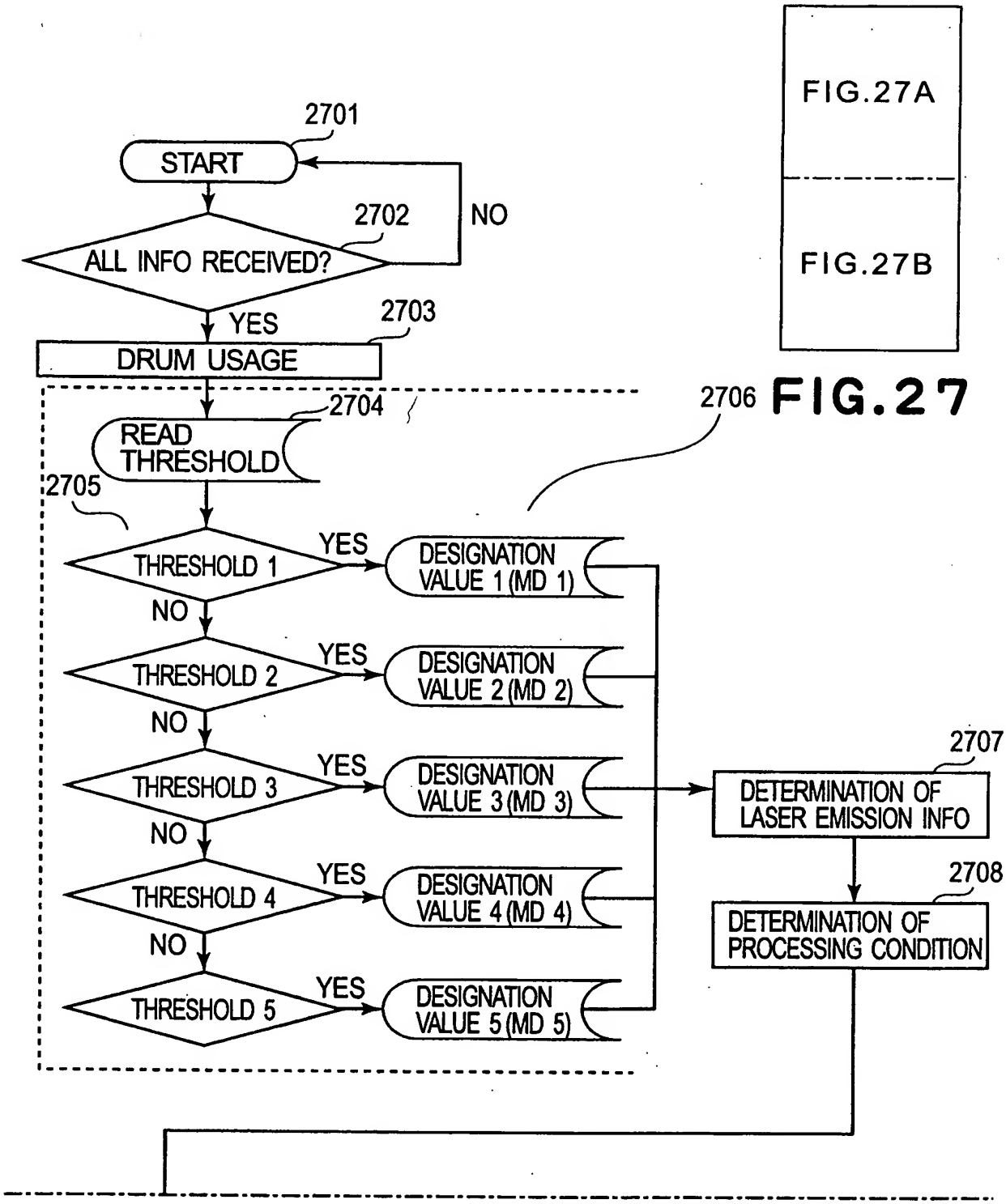


FIG.27

FIG.27A

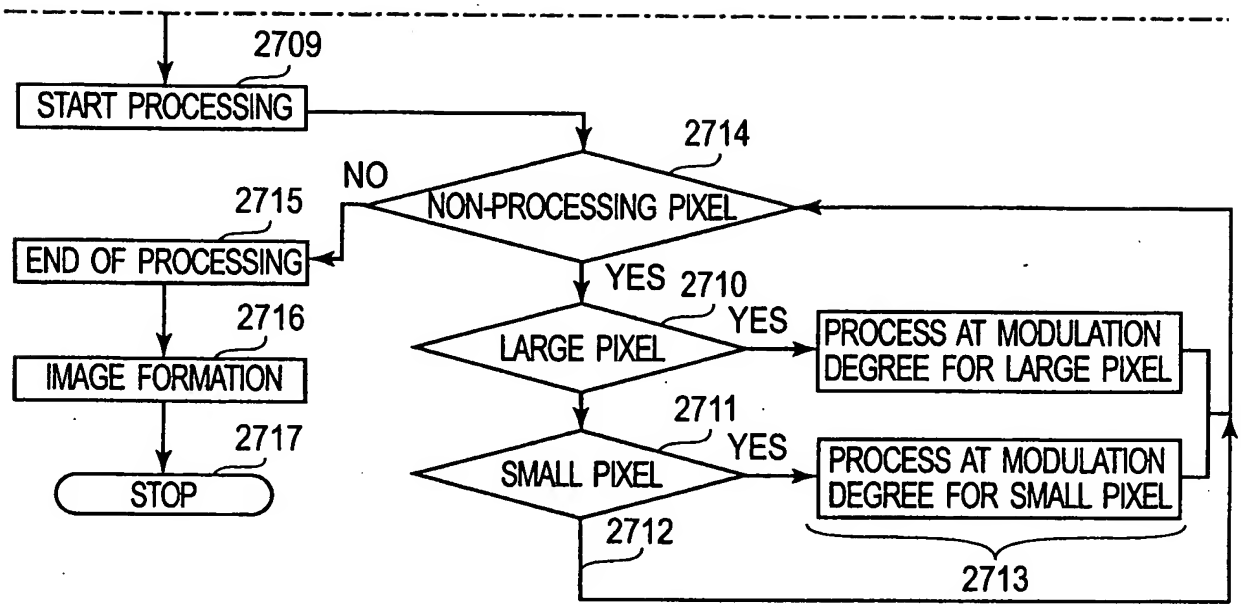

2709
START PROCESSING
2714
NON-PROCESSING PIXEL
NO
2715
END OF PROCESSING
YES
2710
LARGE PIXEL
YES
PROCESS AT MODULATION DEGREE FOR LARGE PIXEL
2716
IMAGE FORMATION
2711
SMALL PIXEL
YES
PROCESS AT MODULATION DEGREE FOR SMALL PIXEL
2717
STOP
2712
2713

FIG.27B

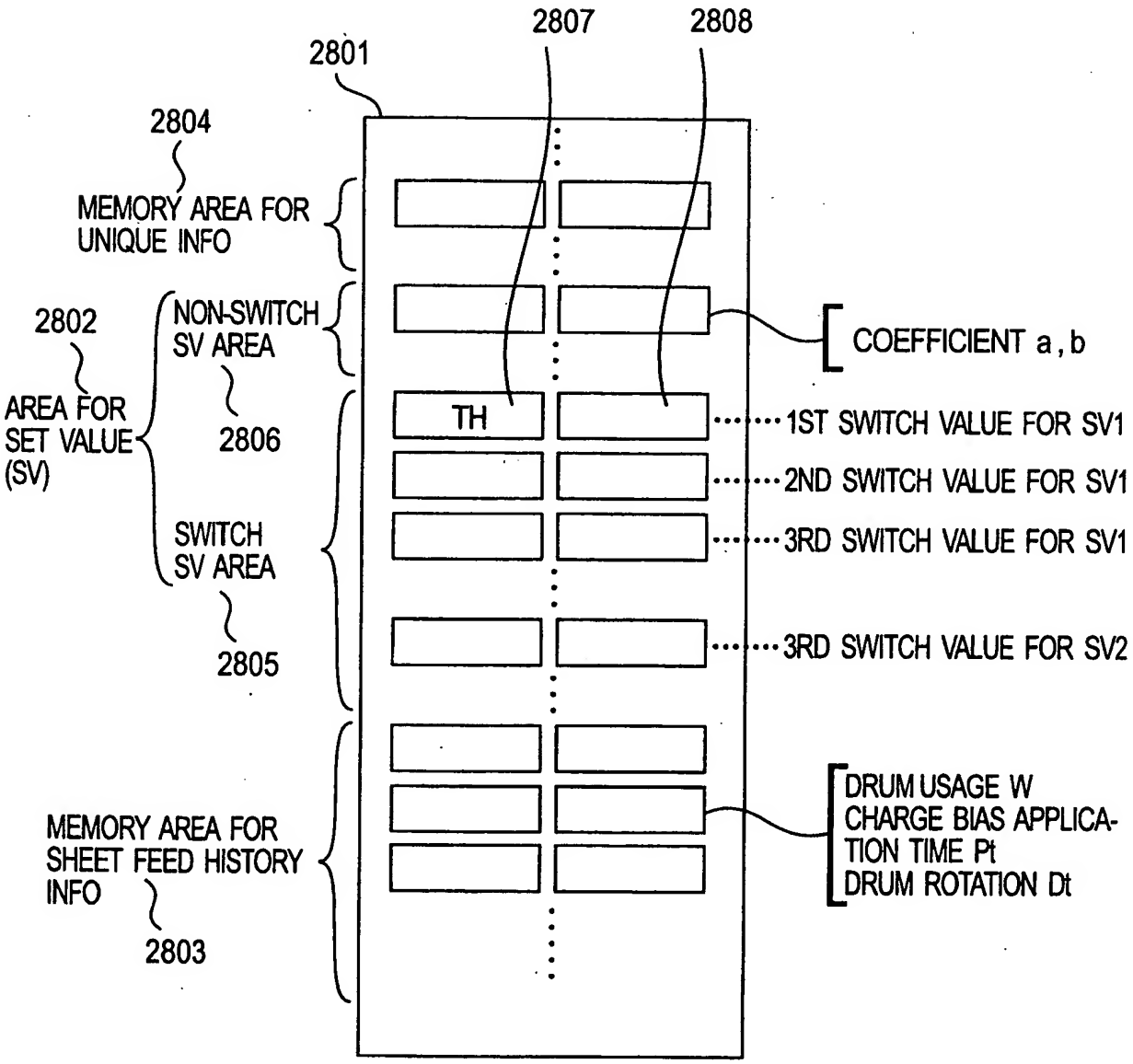

2807
2808
2801
2804
MEMORY AREA FOR UNIQUE INFO
2802
NON-SWITCH SV AREA
COEFFICIENT a, b
AREA FOR SET VALUE (SV)
2806
TH
1ST SWITCH VALUE FOR SV1
2ND SWITCH VALUE FOR SV1
3RD SWITCH VALUE FOR SV1
SWITCH SV AREA
2805
3RD SWITCH VALUE FOR SV2
DRUM USAGE W
CHARGE BIAS APPLICATION TIME Pt
DRUM ROTATION Dt
MEMORY AREA FOR SHEET FEED HISTORY INFO
2803

FIG.28

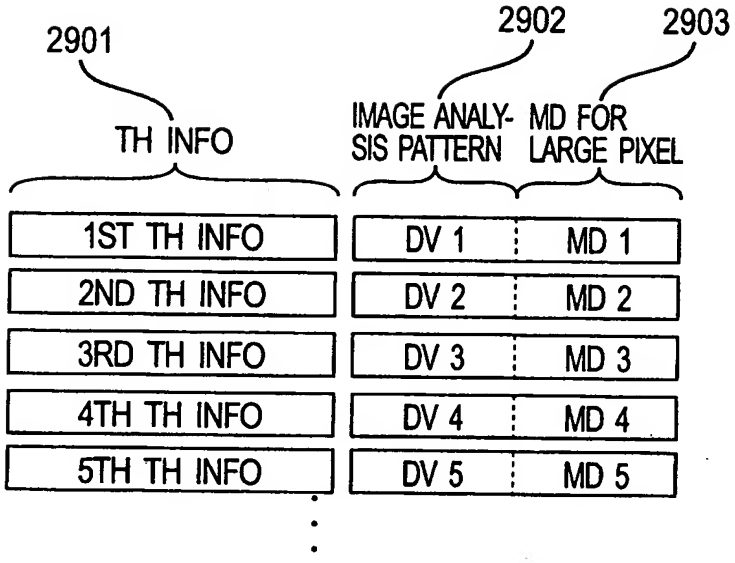

2901
2902
2903
TH INFO
IMAGE ANALY-SIS PATTERN
MD FOR LARGE PIXEL
1ST TH INFO
DV 1
MD 1
2ND TH INFO
DV 2
MD 2
3RD TH INFO
DV 3
MD 3
4TH TH INFO
DV 4
MD 4
5TH TH INFO
DV 5
MD 5

FIG.29

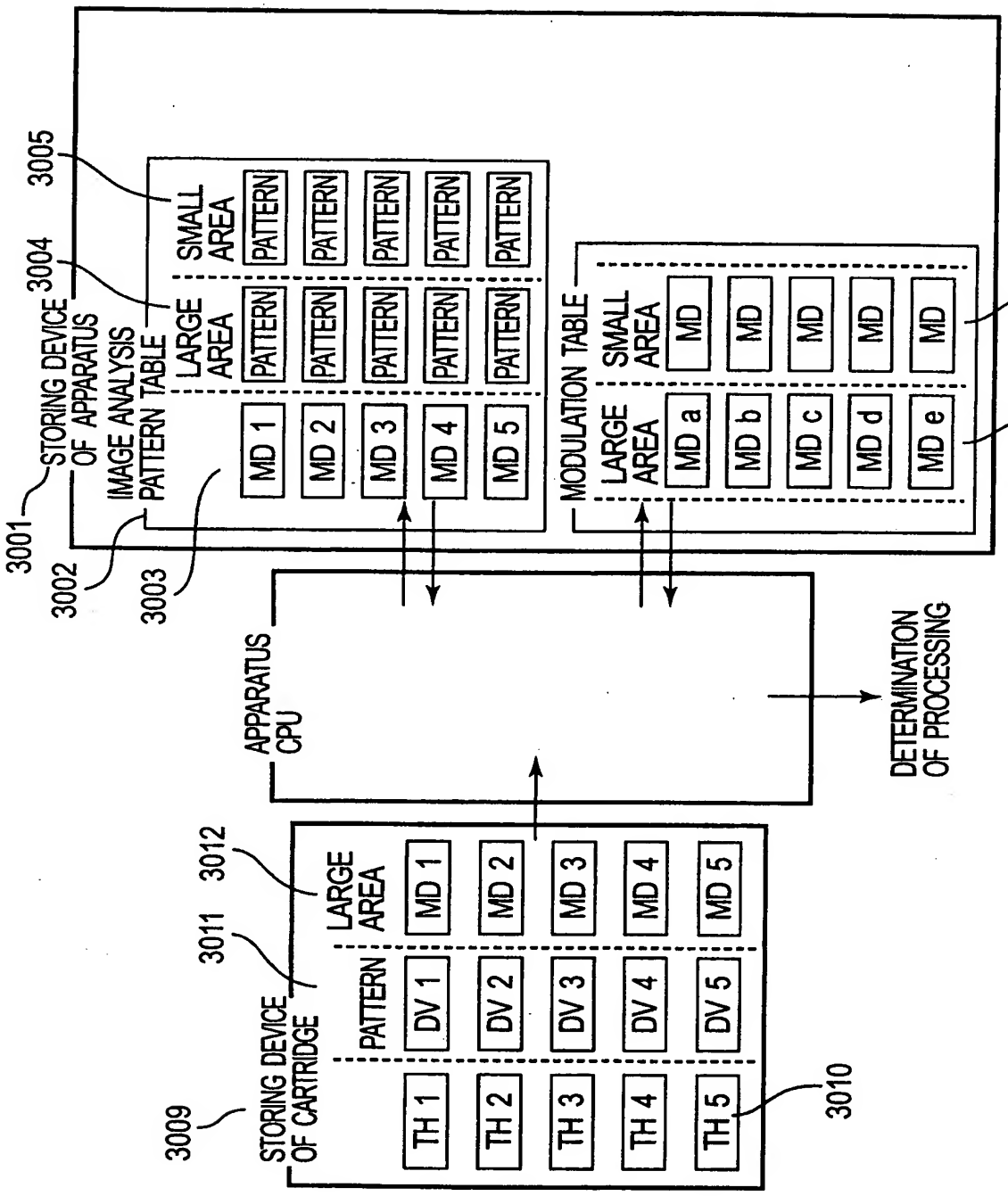

3001
STORING DEVICE OF APPARATUS
3002
IMAGE ANALYSIS PATTERN TABLE
3003
3004
LARGE AREA
3005
SMALL AREA
PATTERN
MD 1
MD 2
MD 3
MD 4
MD 5
MODULATION TABLE
3006
3007
MD a
MD b
MD c
MD d
MD e
MD
APPARATUS CPU
DETERMINATION OF PROCESSING
3009
STORING DEVICE OF CARTRIDGE
3010
3011
3012
PATTERN
DV 1
DV 2
DV 3
DV 4
DV 5
TH 1
TH 2
TH 3
TH 4
TH 5

FIG.30

FIG.31A

FIG.31B

FIG.31

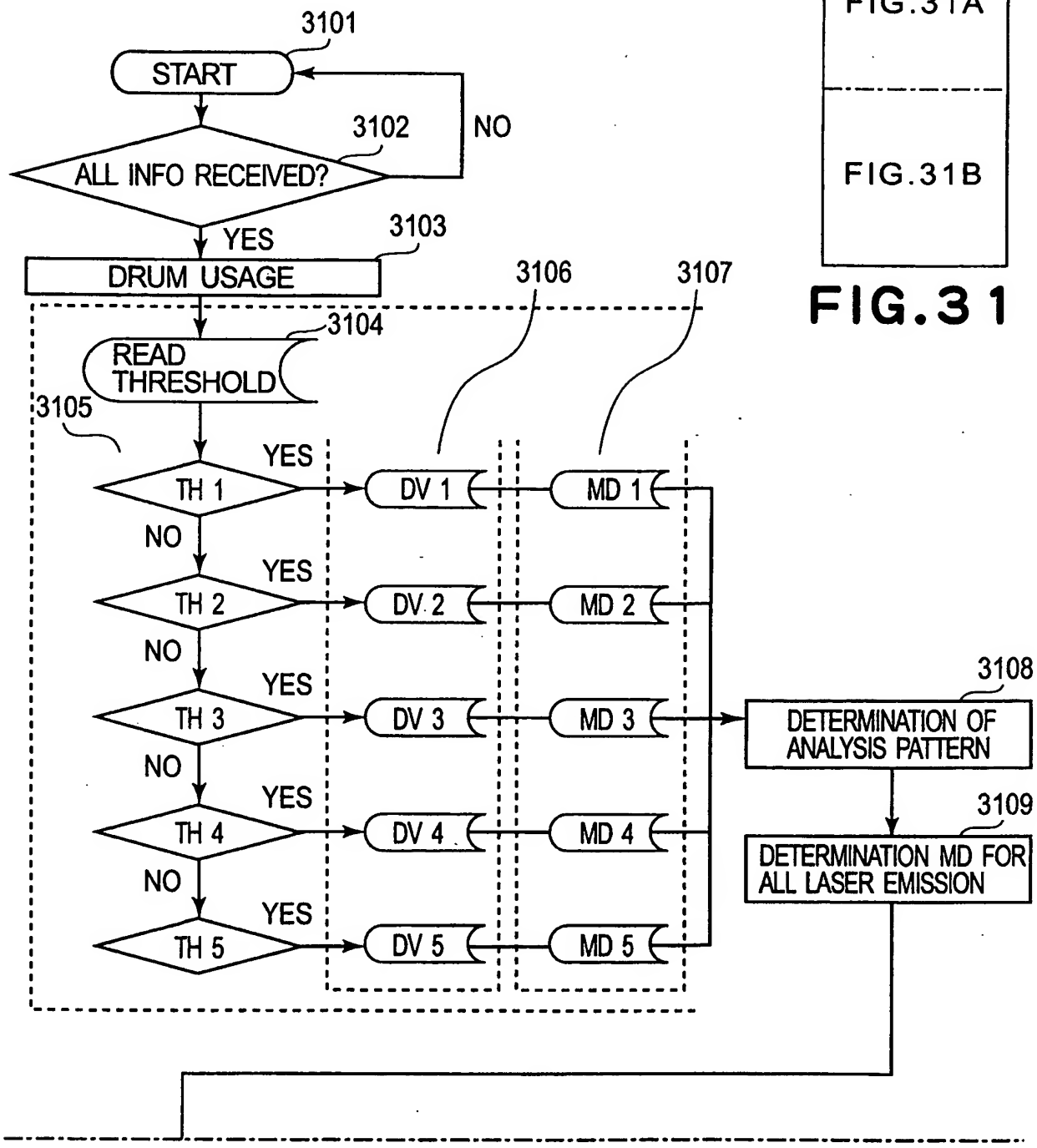


FIG.31A

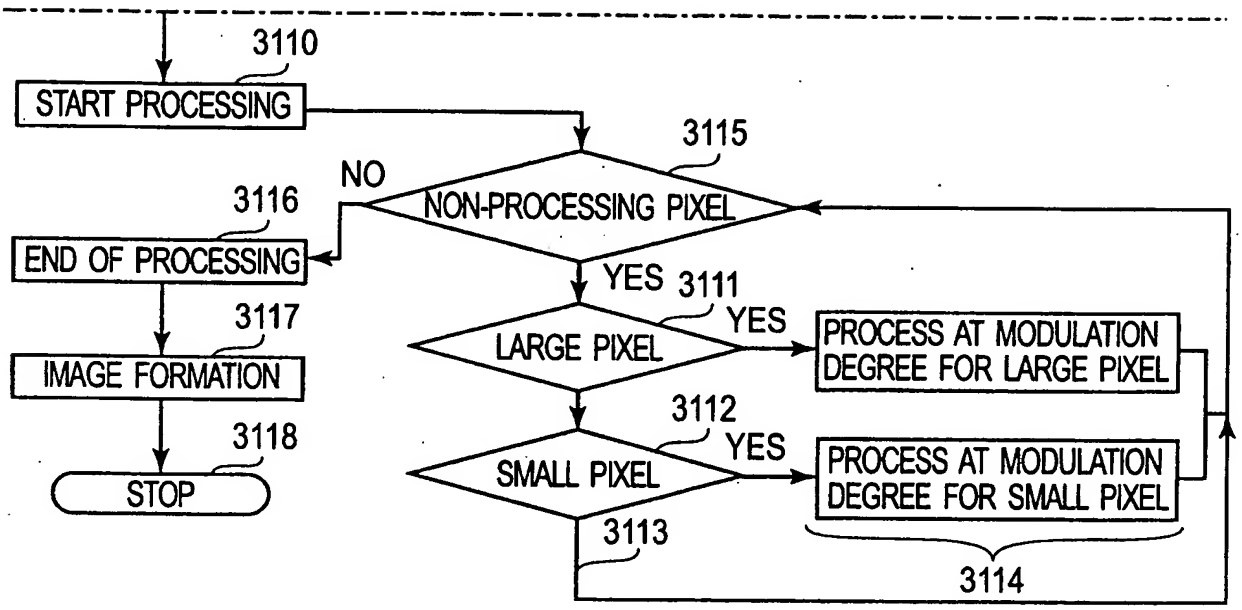

3110
START PROCESSING
3115
NON-PROCESSING PIXEL
NO
3116
END OF PROCESSING
YES
3111
LARGE PIXEL
YES
PROCESS AT MODULATION DEGREE FOR LARGE PIXEL
3117
IMAGE FORMATION
3112
SMALL PIXEL
YES
PROCESS AT MODULATION DEGREE FOR SMALL PIXEL
3118
STOP
3113
3114

FIG.31B

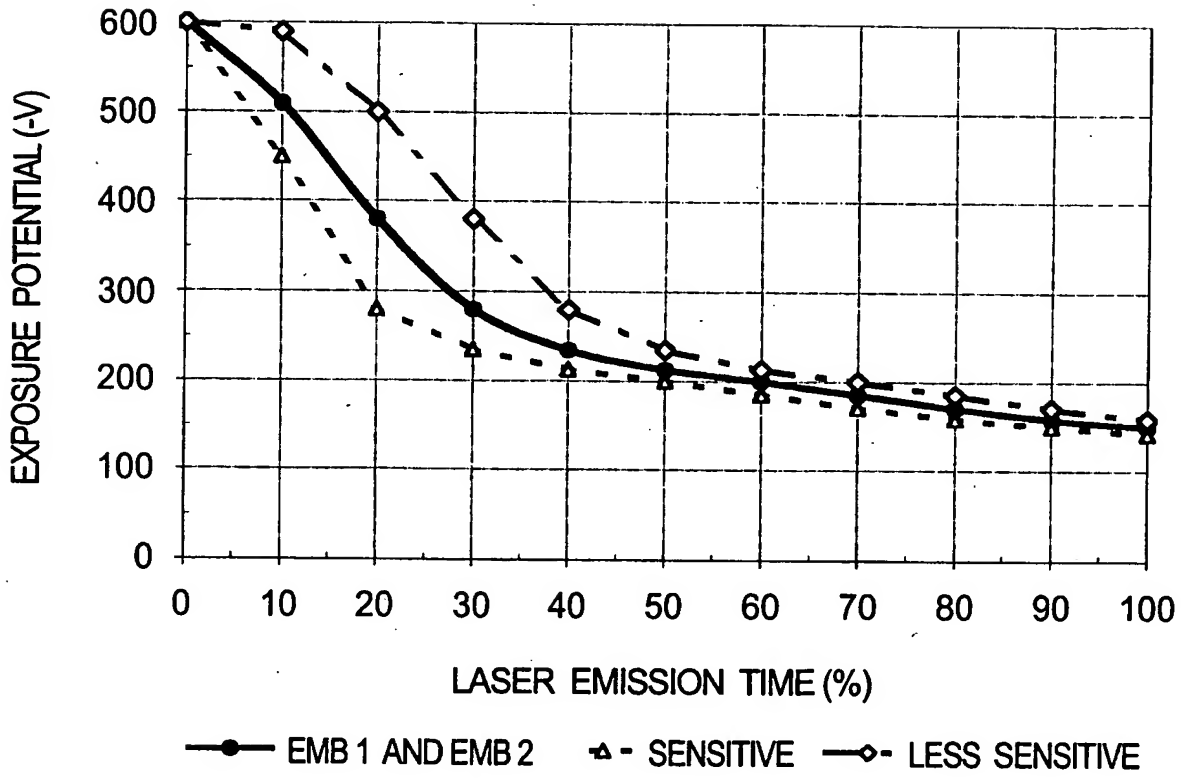
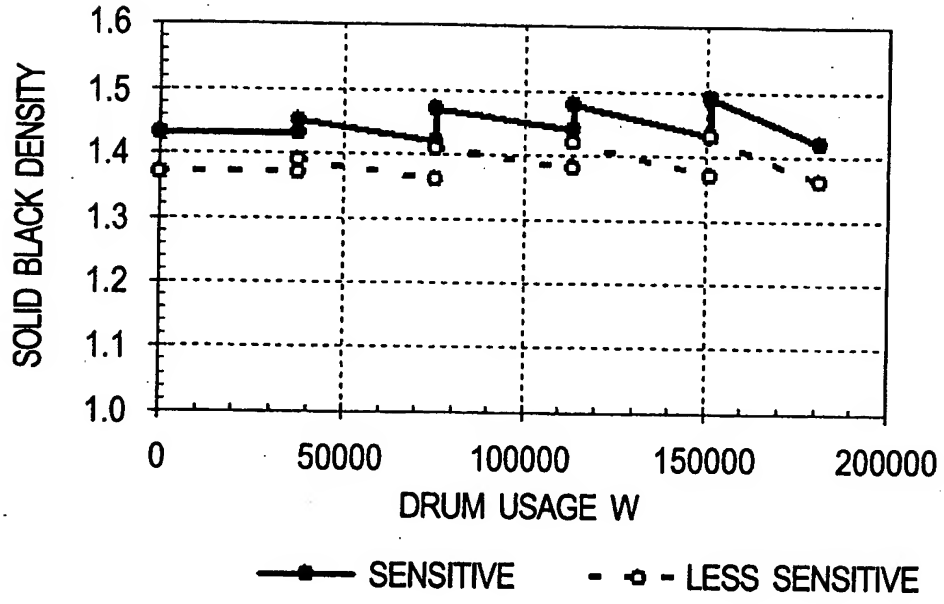

600
500
400
300
200
100
0
EXPOSURE POTENTIAL (-V)
0
10
20
30
40
50
60
70
80
90
100
LASER EMISSION TIME (%)
EMB 1 AND EMB 2
SENSITIVE
LESS SENSITIVE

FIG.32

(a)


SOLID BLACK DENSITY
1.6
1.5
1.4
1.3
1.2
1.1
1.0
0
50000
100000
150000
200000
DRUM USAGE W
SENSITIVE
LESS SENSITIVE

(b)

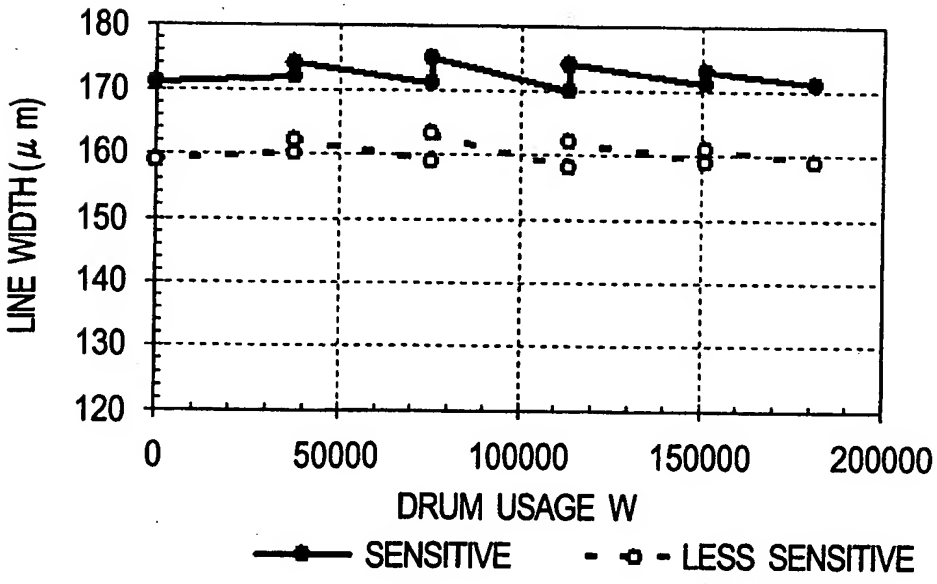

LINE WIDTH (μm)
180
170
160
150
140
130
120
0
50000
100000
150000
200000
DRUM USAGE W
SENSITIVE
LESS SENSITIVE

FIG.33

(a)

USAGE	LINE IMAGE	SOLID BLACK IMAGE
0	75%	50%
37750	77%	55%
75500	80%	60%
113250	83%	65%
151000	85%	70%
181200	-	-

(b)

USAGE	LINE IMAGE	SOLID BLACK IMAGE
0	85%	70%
37750	88%	75%
75500	90%	80%
113250	93%	85%
151000	95%	90%
181200	-	-

FIG.34

(a)

TH INFO		ID INFO
0	-	1
37750	-	2
75500	-	3
113250	-	4
151000	-	5

(b)

TH INFO		ID INFO
0	-	5
37750	-	6
75500	-	7
113250	-	8
151000	-	9

FIG.35

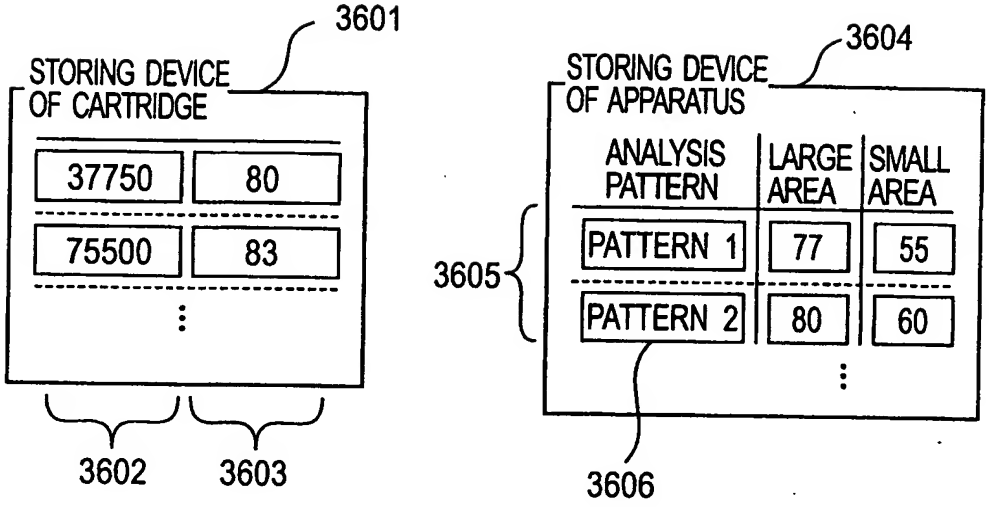

3601
STORING DEVICE OF CARTRIDGE
37750
80
75500
83
3602
3603
3604
STORING DEVICE OF APPARATUS
ANALYSIS PATTERN
LARGE AREA
SMALL AREA
PATTERN 1
77
55
PATTERN 2
80
60
3605
3606

FIG.36

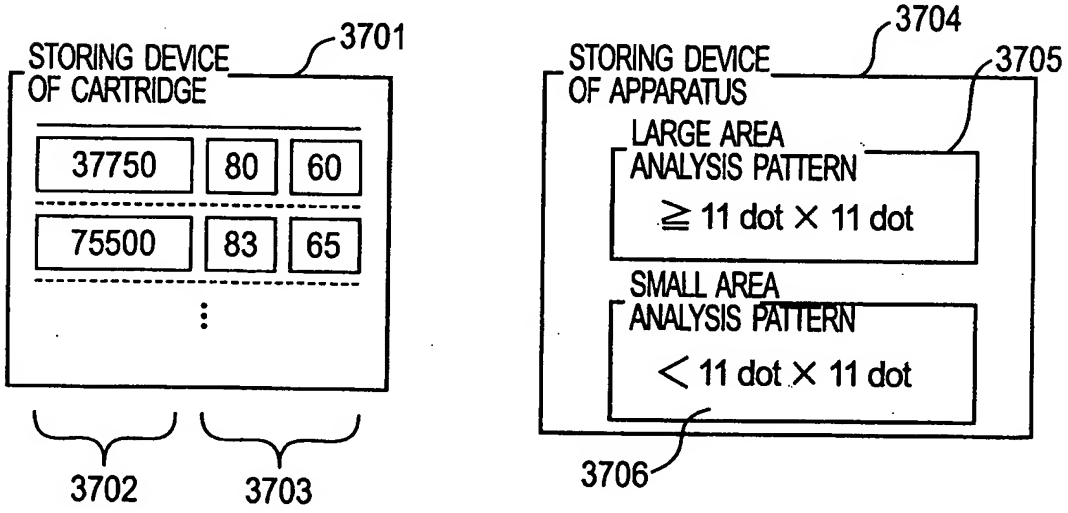

3701
STORING DEVICE OF CARTRIDGE
37750
80
60
75500
83
65
3702
3703
3704
3705
STORING DEVICE OF APPARATUS
LARGE AREA ANALYSIS PATTERN
≧ 11 dot × 11 dot
SMALL AREA ANALYSIS PATTERN
< 11 dot × 11 dot
3706

FIG.37

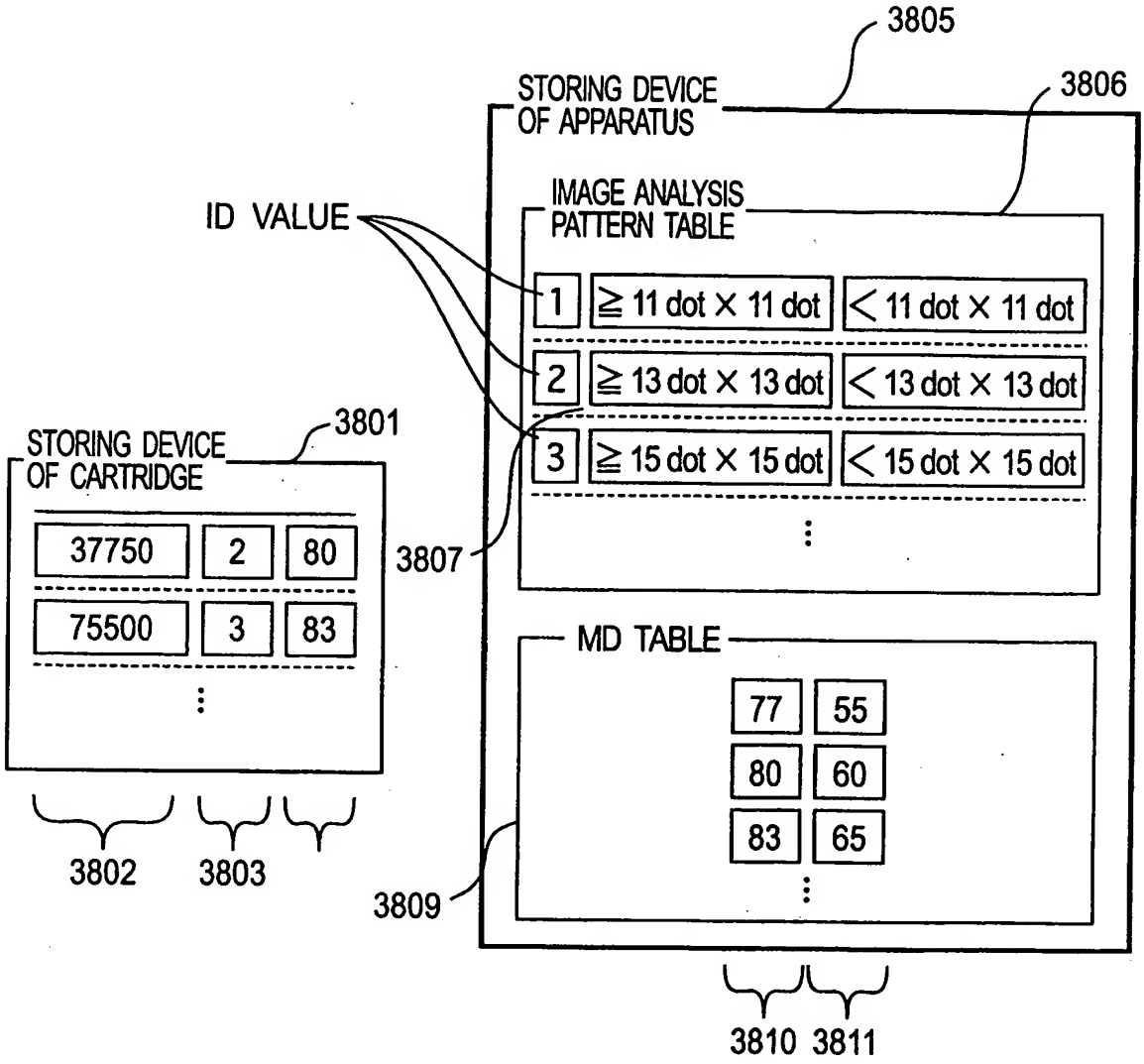

3805
STORING DEVICE OF APPARATUS
3806
IMAGE ANALYSIS PATTERN TABLE
ID VALUE
1
≧ 11 dot × 11 dot
< 11 dot × 11 dot
2
≧ 13 dot × 13 dot
< 13 dot × 13 dot
3
≧ 15 dot × 15 dot
< 15 dot × 15 dot
3807
3801
STORING DEVICE OF CARTRIDGE
37750
2
80
75500
3
83
MD TABLE
77
55
80
60
83
65
3809
3802
3803
3810
3811

FIG.38